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Information for
Riflemen on the Range and
Battlefield

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csc INFORMATION FOR RIFLEMEN

—ON THE—

RANGE AND BATTLE-FIELD

COMPILED FROM THE BEST AUTHORITIES

BY COLONEL J. C. KELTON, U. S. ARMY.

On the Range---

"Always try to put your bullet where the marker cannot fail to find it."

On the Battle-field---

"The best foundation for discipline is the respect of men for the knowledge and ability of those who lead them."



SAN FRANCISCO, CAL.

— 1884 —

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USEFUL INFORMATION FOR RIFLEMEN.

COMPILED FROM THE BEST AUTHORITIES.

No one can doubt that the average capacity of the men to learn how to use their arms effectively, is the same in all companies and at all posts. Nearly all men enter the service without previous experience in the use of arms, and the number of those in any organization who have had previous experience is too small to affect its character. Moreover the experience of that small number is seldom such as to be of value in the prescribed course of rifle instruction. It cannot be supposed that there are any essential differences in the averages of either physical or mental qualification in the different parts into which the army is divided. This being the case the different results obtained in different organizations must be due to the officers who command them, and to the officers alone. Where officers are obedient and carry out in good faith the orders which prescribe the course of rifle practice; where they are intelligent and zealous; where they not only demand obedience from their men, but seek to awaken their interest in this, the most important part of their instruction, and especially where they endeavor to excite emulation by practicing with their men and by becoming good shots themselves, excellent results will assuredly follow.

But when officers are disobedient and fail to carry out with precision the orders of their superiors; when they are indifferent and lukewarm; when the instruction which it is their duty

“The Army of the United States is only a national military school, and but a small school for so great a nation.

“It is therefore the duty of its officers, each one of whom is an instructor, to render the methods of tuition as perfect as possible, so that the men which the Government may any day be required by dire necessity to call upon and organize into armies for its defence, may be quickly taught to be not only individual marksmen, but to act in unison in masses.”

to give, if given at all, is given in a mechanical and perfunctory manner, without warmth or interest, their men will as assuredly fail to learn the use of their arms, and under existing conditions of warfare they will be nearly worthless as soldiers.

In these days of arms of precision, and with the tactics which these arms have made necessary, the man who has not been taught to attain his mark with reasonable frequency at distances much greater than one or two hundred yards, is an incumbrance rather than a helper on the battlefield.

Moreover, offensive power in action is defensive power also. Indeed, there is no other defensive power except, perhaps, the power to run away, and, inasmuch as the Department Commander is sure that there is no officer in the Department who would contemplate that method of preserving the lives of his men, he is forced to the conclusion that those who habitually and persistently neglect the instruction of their men in the use of the rifle are thoughtless of—he trusts that they are not wholly indifferent to—the great responsibility which rests on those in whose hands the lives of men are placed.

The Department Commander is aware that for the neglect of a few officers some palliation may be found in the fact that their men have been busily employed during the past summer as mechanics and laborers, in building and repairing barracks, quarters, etc. This fact, however, is only a palliation, it is not a justification; or at least it is not a justification for the commanders of the posts where the men have been so employed. It may be a justification for the company officers at such posts.

a Sentiments expressed by Bvt. Maj. Gen. A. A. Terry, U. S. Army, in an Address delivered at West Point in June, 1883.

a "War is itself a school of the sternest and most thorough character; it teaches not only the theory of military art, but its practice also. The army, which is often engaged in war, which frequently puts in practice the theory of the art, preserves the knowledge of the theory and instructs the recruits which from time to time swell its ranks, at least in the practice. And, after all, the utility of the theory is only that the practice may be perfect."

The building and repairing of barracks and quarters is a necessity, and, unfortunately, the work must, to a great extent, be done by the labor of troops. But the instruction of the men in the use of their arms is a greater necessity, it is the paramount necessity, and it must not be neglected in favor of any work whatever. It is sometimes urged as an excuse for failures to have target practice, that troops have been in the field; but this is no excuse at all. Of course, when the troops are making long marches in an active campaign there is little or no time for instruction; this is the time when the fruits of former instruction should show themselves; but no field duties have been imposed on any troops in the Department during the past year which should have prevented target practice from being carried on with tolerable regularity. Targets can be improvised and practice can be had everywhere in the open country. Indeed, practice, under the conditions which exist in the field, may often be a very valuable variation on the practice which takes place on the ranges established at posts. Some of the troops which were in the field during the last summer and autumn did keep up their practice and did attain results which, to say the least, were not discreditable.

To avoid, in the future, all questions upon these points, the Department Commander now *directs* that hereafter no work of any kind, no matter how important it may be, and no absence from stations shall be suffered to prevent the regular and complete instruction of the men in the use of the rifle, or to pre-

a "Paradoxical as it may be, the more pacific a nation is, the less frequent the wars in which it engages, the more it needs institutions for military education. Nations, who from their situation and from their relations with their neighbors are compelled to keep constantly on foot large armies, and who, through misfortune, or, perhaps, through ambition, are frequently involved in war, are better able to dispense with schools of theoretical military instruction than those whose happier fate it is to be nearly always at peace."

vent their having that amount of practice which is requisite to make their fire effective.

—G. O. 27, *Headqrs. Dept. of Dakota*, Dec. 20, 1882.

A captain of a company in this Department having applied to the General of the Army to be relieved from the operation of so much of General Orders No. 36, series of 1881, from these headquarters, as requires officers to shoot with their companies, on the ground of its being undignified, and, in his opinion, injurious to discipline; and, moreover, "*distasteful to him*," the following is published for the information of all concerned:

[Endorsement, January 9, 1883, by Department Commander, in forwarding, through Division Headquarters, to the Adjutant General of the Army.]

"If an officer is to be of any use as an instructor to his men, in any branch of military knowledge, he must first make himself master of the branch. To do this he must not only understand the theory of the matter in question, but must have a thorough practical knowledge of it as well; particularly is this the case in target firing. The theory of firing presupposes a perfect arm, perfect sights and perfect aim. Practically we have none of these; guns are often imperfect, as well as cartridges; sights are frequently defective; and allowances have to be made for wind as well as for light and mirage. No officer can instruct his men how to overcome these difficulties unless from his own practical experience. To do this he must practice shooting himself, and it seemed to me the proper time to do so was with his company, when, if difficulties of any

a "But that unfortunate nation whose situation upon the earth, or whose temper preserves it ordinarily from the last and worst of calamities—armed conflict with its neighbors—that maintains no large armies in which and by which military knowledge, both theoretical and practical, can be preserved and handed down from generation to generation, must, if it would not disregard utterly the teachings of history and the experience of the ages, provide special means for the perpetuation of that knowledge without which armies cease to be armies and become mobs, without which the bravest and most patriotic of its people are completely at the mercy of trained and instructed soldiers. In other words, it must maintain military schools."

kind arose, he could explain them and show how they could be overcome.

"When a captain, I always practiced with my company to my own great advantage, and, I believe, to the advantage of my company, without finding it at all injurious to discipline.

"The discipline of a company must be in a precarious condition when it is endangered by the men seeing their officers striving to acquire knowledge of their duties that they may the better instruct and benefit them.

"It is to be regretted that * * * should find any of his military duties 'distasteful to him,' particularly that special portion of them which, in the present condition of the art of war, is considered one of the most essential.

"The army is not a kindergarten for developing and cultivating particular tastes, nor is it a school for elective studies, but is intended for rough practical business, and demands of every one connected with it, in his particular sphere, not to worry too much about his dignity but to go to work and qualify himself to his fullest capacity, that he may the better assist in making our little army a thoroughly instructed and efficient one.

"Enclosed are the only orders of this Department on the subject, to which * * * refers.

"*Apropos* to this comes this very day a letter from Division Headquarters stating that the Lieutenant General has observed

a "It would not be in accordance with the spirit of our political institutions to single out a few young men and educate them above the majority of their fellows for their own benefit. It has been given to them by the country for its benefit; they hold it as a trust. And they must remember that they cannot stand still. We know that the whole material universe, from the atoms to the stars, is in motion; that in it motion is life and rest is death. So is it in the realm of mind; the mind must move, and if it does not go forward it will go back."

an apparent lack of interest and attention on the part of some officers in this Department in this very matter of target practice. It is possible that other officers may be affected as * * * is, but if so, none has put his case on record."

[Letter in reply, dated January 31, 1883, from the Adjutant General of the Army to the Department Commander, through Division Headquarters.]

* * * * *

"In reply thereto the General of the Army directs me to inform you that having read carefully the letter of * * * and your endorsement thereon, he fully concurs with you in your views on the subject, believing that no competent officer can compromise his lawful authority by mingling on terms of equality with his men in manly games and sports, much less in the prescribed contests with the rifle.

"The General remarks, in this connection, that he has witnessed at Aldershot, England, on the public parade ground, contests with the foil, the broadsword, the quarterstaff, and in leaping, where the major, captain, lieutenant, sergeant, corporal, and private of the same battalion (often officers and enlisted men of the same company) were the participants—quite frequently the sergeant or private beating his own captain; and as such contests occur in the English army, it seems strange to him that a captain in our army should object to participating with his men in target practice with the rifle. The captain enters the service for life and has every advantage in education and experience over his men, who enlist for terms of five years. He should know more of the theory and prac-

a "The military art is a constantly changing and constantly progressing art—never before so rapidly changing and progressing as now, and even if the military officer could stand still, his profession in a few short years would leave him far behind."

tice than any of his men, because he is their instructor and leader. While it is well known that accurate marksmanship depends largely on the perfection of eyesight, the steadiness of muscle, and strength and health of body, in which the enlisted man may be the superior of his captain, the General would be sorry to learn that any captain in the army of the United States was inferior to any of his men in nerve, in steadiness, or in the knowledge of the weapon used by his command. He has also seen the best officers of our army firing with their men.

"In conclusion, I am directed to state that he approves of the standing orders in force in the army for target practice, and those in force in the Department of Texas, especially General Orders No. 36, of October 25, 1881, from your Headquarters, to which it is understood * * * objects."

—Circular No. 1, *Headqrs. Dept. of Texas*, Feb. 14, 1883.

The Target Year.

The target year ends September 30th.

—G. O. 86, 1879.

"The target season" means that part of the year in which target practice is pursued. "The target year" is from October 1st to September 30th, succeeding.

Letter to C. G. Div. Atlantic, Oct. 4, '83—4050 A. G. O., '83.

In a letter from the Headquarters of the Army, dated May 25, 1883, to the Commanding General Department of California, the General of the Army decided that this year the "target year" should be understood as commencing April 12, 1883, the date of General Orders No. 25.

a "To the graduate of a military school who is content to rest upon his past, who does not look forward to the future, who does not seek to prepare himself for future usefulness in wider and wider spheres, a diploma ceases to be a mark of distinction."

All men who have been on the rolls of the company between April 12 and September 30, 1883, should be considered in computing the figure of merit. Men who were on the company rolls prior to April 12th, but not subsequent to it, should not be considered in computing the figure of merit.

—*Ordnance Office, Washington, September 4, 1883.*

Rifle Instructors and Instruction.

The course of "Instruction in Rifle-Firing" (Laidley's) will be the approved system allowed in the service for the instruction of the Army in the use of the rifle [revised edition, 1880, subsequently published].

—*G. O. 86, 1879.*

* * * In addition to the officers named in General Orders No. 135, series of 1882, from this office (Paragraph 45 of the Regulations), by authority of the Secretary of War, each Division and Department Commander may select from troops serving in his command an officer to act as Inspector of Rifle Practice.

These inspectors will be chosen with regard to special fitness and practical qualifications for supervising the existing system of rifle practice.

Before being announced in orders, selections will be made subject to approval by the Commanding General of the Army; and in no case will a detail of the colonel, or senior officer commanding a regiment; or the captain, or senior officer commanding a company,—be permitted.

—*Extract Letter Hdqrs. of the Army, A. G. O., Nov. 17, '83.*

a “Pleasures and enjoyments within the bounds of reason are as necessary as labor to man’s best development, both of body and of mind. But I beg you to believe that I speak the opinion and tell you of the experience of all thoughtful men who have reached and passed middle age when I say that a life of honest and honorable effort is the only happy life.”

Every enlisted man should be taught the use of the rifle, and made to attend target practice. All questions in regard to the extent of the instruction of the non-commissioned staff and band in rifle practice should be determined by post and department commanders.

—*Cir. No. 4, Headquarters of the Army, A. G. O., May 24, 1883.*

All company and battery officers will practice with the men and will be expected to become theoretically proficient in the use of the rifle.

—*G. O. 5, M. D. A., 1882.*

The commanding officer at every military post will enforce existing orders and regulations on the subject of target practice.

—*Par. 1, G. O. 53, 1882.*

Every commanding officer of a post will name an officer to supervise the target practice.

—*G. O. 95, 1877; par. 482, A. R.*

The regular annual course of instruction will be taught by an Instructor in Musketry.

—*Par. 10, Laidley.*

The range and the repair and order of targets, butts, grounds, etc., may be placed in charge of the Instructor in Musketry at the post.

—*G. O. 5, M. D. A., 1882.*

Post and company commanders will exercise direct supervision over the instruction of their commands.

—*G. O. 5, M. D. A., 1882.*

“The art of commanding men is not the art of giving orders and inflicting punishment if they be not obeyed. *It is the art of obtaining from men a willing obedience; the art of drawing forth their utmost efforts; the art of inspiring them with such sentiments of duty and devotion that no obstacle can daunt them, no danger can appall.*”

Battery and company commanders, with their subalterns and non-commissioned officers, are the proper instructors of their commands.

—*G. O. 1, M. D. A., 1883.*

Men firing will be carefully superintended by competent instructors.

—*G. O. 5, M. D. A., 1882.*

Thorough and systematic instruction and practice will be required at all posts, with which details for extra and daily duty, and fatigue, will not be permitted to interfere; and sufficient time will also be assured for careful in-door instruction and practice on the ranges.

—*G. O. 5, M. D. A., 1882.*

Rifles.

The service rifle and service ammunition will be used in target practice, and in department, division, and army contests.

—*Par. 6, G. O. 53, 1882; G. O. 70, 1881.*

The marksman's rifle will no longer be issued as contemplated in par. 524, revised edition, Laidley.

—*Par. 7, G. O. 53, 1882.*

The Springfield long range and marksman's rifle may be permitted, together with the special and experimental ammunition on hand for use, over longer ranges in matches arranged by division commanders.

—*Par. 10, G. O. 53, 1882.*

a “The most important qualities for the man who seeks to command men are not intellectual qualities: they are moral; it is a firm, honest, unselfish, and just character that commands the respect of men, attracts their confidence and secures their obedience.”

Officers serving with troops may draw for their personal use in target practice a rifle from those belonging to the command; also appropriate belts, cartridge boxes, and ammunition.

—G. O. 4, 1879.

Care Enjoined with Loaded Rifle.

427. No one is allowed under any circumstances to point a rifle at any one, even if he know it is not loaded.

428. No person is permitted to let a rifle pass out of his hands while loaded; the cartridge must first be withdrawn.

—Laidley.

Caution in Using the Rifle.

The attention of all concerned is invited to the following communications, published as Ordnance Note No. 99, dated February 24, 1879, setting forth the possibility of premature explosions, and thereby of accidents occurring, in forcing tight fitting shells into rifles by violently closing the breech-block. As the refilled shell, now used to such a great extent in target practice, will often be found to fit tightly, too much care cannot be taken to give the rifle a safe inclination when loading with the refilled shells, and to load only at the firing point.

—Circular Mil. Div. Pac. & Dept. Cal., April 25, 1879.

Two golden rules on this subject should ever be borne in mind:

Never point a gun, whether loaded or not, at any animal whose life you have not deliberately resolved to take.

a "The worst disqualification is the love of power. The desire for power for the sake of the good that one may do is a noble emotion; the love of power for power's sake is one of the meanest passions of the human heart."

Never take the life of any creature that is harmless when alive, and useless when dead.

—*The Rifle, and How to Use It.*

Whenever the danger signal is displayed, the breech-block of all breech-loaders should be thrown open, so as to render an accidental discharge impossible. If the firing is suspended, the cartridge should be withdrawn. All loaded rifles should be kept at half-cock, and even then it is a golden rule to "always look at your rifle, and never allow your rifle to look at you or anyone else."

—*Wingate.*

Loading the Rifle.

The rules of all well regulated ranges are explicit in their injunctions as to putting the cartridge in the rifle. *Never* load a breech-loader except at the firing point, and then keep the muzzle towards the target. No possible amount of regret could ever repair the damage, if by chance your rifle should ever once cause an accident. Many riflemen, on finding a cartridge fit tightly, seek a stump, and, grasping the hammer with their fingers, strike the breech-block on the stump, driving the cartridge into the chamber. The firing pin is in the centre of the breech-block; should it get caught and hit the cap, or should the cap be flush with the head of the shell and the breech-block set it off, disaster must ensue, for there is no support for the breech-block, which cannot be locked till it is closed.

—*Perry's Observations on Rifle Shooting.*

a “The profession of arms has been the object, sometimes, of the admiration and, sometimes, of the execrations of mankind. By turns it deserves them both. Which it should receive depends upon the manner and the spirit in which, and the objects for which, it is pursued.”

Use of Chamber Rifles.

A very useful means of instruction in aiming is made use of in both Austria, France, and Prussia, and one which will appear novel to most of our readers, viz., the employment of the so-called *chamber rifles*.

These are rifles in every outward respect similar to those with which the men are armed, but they are of very much smaller calibre, and fire a shot not much bigger than a pea. They are used as an addition to aiming drill, to perfect the men in aiming, and possess the advantage of being safe to use in the barracks-square or barrack-rooms, while their use imparts a *vraisemblance* to the practice and interests the men in a degree which it would otherwise be impossible to attain. Indeed, it is found in Prussia that the men frequently have recourse to them as a source of amusement in barracks.

—*Ordnance Note, No. 111.*

Penetration of Rifle Bullet.

“The penetration of the rifle bullet [powder 70 grains] into sand and earth is as follows:

“Into compressed loam, nine to sixteen inches. Into loose sand, five to nine inches. A box two feet square, white pine, $\frac{3}{8}$ inches thick, filled with loose earth, penetration eighteen to twenty-four inches. Box filled with sand, penetration nine to eighteen inches. Range, fifty yards. * * *

—*Lieut.-Col. James M. Whittemore, Ordnance Department.*

a "History is full of examples of what the soldier should not be. The great conquerors of antiquity, animated solely by a lust for power and dominion, ruthlessly scattering desolation and misery among their fellowmen."

Sights, Sight Covers, etc.

It is allowable and fair to have shades over your sights. By all means procure them.

—*Perry's Observations on Rifle Shooting.*

The end of a shell, split, makes a good sight cover as a temporary expedient.

To avoid any glare or reflection from the sun, all sights, whether of military or target rifles, should be blackened with smoke. Burnt rubber is very good, or a wax match, or, better still, lampblack dissolved in ether; the latter must be kept tightly corked to prevent evaporation. In addition, the best shots at Creedmoor make a shade for the whole front sight upon their target rifles by wrapping a piece of stiff paper around the barrel, so as to enclose it, making a tube three inches long. Some have a regular brass shade for the purpose. This would not be allowed upon military rifles.

—*Wingate.*

In practice and contests, the aiming notch of the rear-sight slide may be slightly opened or widened to accommodate individual peculiarities of eye-sight; no other alteration or filing of the regular service sight, as issued by the Ordnance Department, will be permitted.

—*Par. 6, G. O. 53, 1882.*

There is no objection to whitening the front sight, if the soldier can do better work with it. This coloring should be left to the judgment of the soldier.

—*Letter Hdqrs. of the Army, A. G. O., July 25, 1883.*

Sights may be blackened, but not whitened or colored.

—*Page 206, Appendix, Laidley.*

a “Dazzled by the splendor of their genius the world for a space forgets the atrocity of their deeds; but time, though it moves slowly, is implacable; it brings its revenges at last, it strips away the false glory that gilds their names and leaves their moral deformity naked and exposed to the detestation of mankind.”

Ammunition.

The ammunition now supplied is the reloading rifle-ball-cartridge, model 1881, 70 grains of powder and 500 grains bullet (service bullet), and Frankford Arsenal primers.

—*G. O. 1, M. D. A., 1883.*

Ammunition unexpended at the end of the fiscal year will no longer be available.

—*G. O. 23, 1883.*

Firing practice should, as far as practicable, be confined to the reloading material supplied by the Ordnance Department.

—*G. O. 1, M. D. A., 1882.*

Each man is entitled to fire 240 cartridges per annum.

—*Par. 481, A. R.*

In addition to the above allowance, officers and men selected to compete for places on department, division, and army teams, will, after being assembled at the post designated for the purpose, be allowed all the ammunition needed for preliminary practice and final competition.

—*Par. 481, A. R. (as amended by G. O. 89, 1882).*

The aggregate authorized allowance of ammunition, 240 rounds per annum, for each man, may be expended at such periods in the year as department commanders may think best.

—*G. O. 62, 1881.*

Until reloading tools can be supplied to the cavalry, the allowance yearly of ball cartridges will be 400 rounds each for pistol and carbine.

a "But history presents us with other examples, examples not of warning, but examples for imitation; it presents the names of soldiers who have been the benefactors of their race; of soldiers with hearts untouched by selfish ambition; soldiers who knew not falsehood, nor deceit, nor greed; men whose sympathies were ever with the wronged and the oppressed; whose ears were ever open to the complaints of the suffering; men who knew no law except the law of honor, of duty and of religion."

The expenditure of *blank* cartridges is authorized for the purpose of preliminary training of men and horses, and the amount is left to the discretion of the officer in command (*vide* G. O. 57, series of 1882.)

—*Letter to C. G. Div. Mo., Oct. 8, '83—4123 A. G. O., '83.*

For method of reloading cartridges, see the instructions accompanying reloading tools, issued by the Ordnance Department, and Ordnance Notes No. 231, November 17, 1882.

A spherical bullet may be used with the service shell and reduced charges and targets for in-door and gallery practice. The Ordnance Department will issue the necessary appliances.

—G. O. 36, 1880.

Company commanders, and all other officers accountable for ammunition, shall keep a permanent record for each fiscal year of the number of cartridges expended in target practice at each practice. Any expenditure in excess of the authorized allowance will be charged to the officer accountable.

—G. O. 23, 1883.

The number of rounds of reloaded ammunition each man is entitled to is 622, as the cost of this to the Government is the same as for the present authorized allowance of 240 service cartridges.

—*Circular of October 17, 1878, M. D. P. & D. C.*

This allowance can only be expended for the number of men *actually* present during the month.

—*Decision Sec. of War, Cir. July 6, 1883, Mil. Div. Pac.*

α “Leonidas at Thermopylæ; Tancred of the Crusades; William the Silent of Holland; Gustavus Adolphus of Sweden, and, first, and greatest of all, our own incomparable Washington. These are examples of what soldiers may be; they are examples of what soldiers, each in his station, should humbly strive to be if our profession is to deserve the name often applied to it—and surely sometimes justly applied to it—the noble profession of arms.”

When not expended in target practice, the ammunition may, in the discretion of the post commander, be expended in hunting.

—*G. O. No. 23, A. G. O., 1883.*

Companies having shot-guns issued to them must, when the original supply is exhausted, purchase ammunition with company funds, etc.

—*Circular No. 1, A. G. O., 1883.*

The rifle-ball-cartridge designated in Ordnance Order No. 35, series of 1882, is now the service cartridge, and, consequently, intended for all contests.

—*Circular No. 2, A. G. O., 1883.*

Ammunition expended in the selection of men from companies to compete in department rifle contests, cannot be considered as expended in preliminary practice.

—*Circular No. 7, A. G. O., 1883.*

Four hundred rounds of ammunition per annum, for each man, for the carbine, and the same amount for the pistol, is authorized for target practice.

—*G. O. No. 57, A. G. O., 1882.*

The provisions of G. O. No. 57, series of 1882, do not apply to sergeants of infantry. Ninety-six rounds of ammunition furnished with each pistol issued to sergeants of foot companies is sufficient.

—*Circular No. 4, A. G. O., 1883.*

a "But we need not seek in foreign lands, nor even in our own earlier history, for examples for imitation. We have but to read the roll of graduates of our military schools to find them. There are found names that will shine brightly and more brightly as time goes on; names that will be held in reverence by future generations. I need not speak for them; they are as familiar to you as household words."

Cost of material for reloading ammunition obtained from Ordnance Department, in lieu of loaded ammunition, is as follows:

One bullet.....	\$0.006
One primer.....	0.002
One charge of powder, 70 grains... ..	0.0023
Total.....	<u>\$0.0103</u>

—*Circular of May 21, 1879, M. D. P. & D. C.*

Officers can use as much reloading material as soldiers. An increased allowance can be sold to them.

Sales to officers for their personal use are reported on an abstract of sales giving purchaser's name, quantity, and kind of stores sold, and price. The proceeds of sales should be deposited to the credit of the Treasurer of the United States, and the *original* certificate of deposit sent to this office with the abstract of sales, in duplicate, and accounts current showing the transaction.

—*Endorsement from Ordnance Office.*

Pistol Ammunition for Light Batteries.

General Orders 57, A. G. O., 1882, includes light batteries so far as its provisions are applicable to them, and the four hundred rounds per man per annum of pistol ammunition is allowed to them as well as to the cavalry.

—*Decision General of the Army, G. O. 1, M. D. A., 1883.*

a “But there is one here to-day of whom I cannot forbear to speak, for he is here for the last time as our chief and our leader. The world knows his genius; the world knows what he has achieved. Wherever the morning gun salutes the sunrise his name and fame are upon the lips of soldiers. What all the world may not know those who have been brought near to him do know; they know the warmth and tenderness of his sympathies; they know the generosity of his nature, the magnanimity of his soul.”

Light batteries will be allowed only seven pistols each, the same as foot batteries, with the proper proportion of ammunition.

—*Decision General of the Army, G. O. 1, M. D. A., 1883.*

Score Book.

The importance of keeping a score book cannot be too strongly urged.

Record each shot as it is fired, giving every particular, even to the minutest circumstance, with the utmost fidelity. Mark on the diagram the spot struck on the target, and number it, so that it may be identified. In this way a fund of valuable information, as regards the allowance to be made for a given wind, temperature, or quantity of moisture in the air, will be treasured up and form a useful guide for future practice.

The value of the record will depend greatly upon the care and minuteness with which the entries are made.

—*Laidley's Rifle practice.*

The most important of all requisites to good shooting, is an *accurate* record of every shot fired, whether fired in a score or as an experiment, or to kill time, or to shoot away bad ammunition. Months after you have forgotten such mistakes as you keep out of your book, for looks sake, you will regret it if you cannot find the bad and the reasons, so as to avoid like disaster. Be honest *with yourself* in keeping your score book. You are not obliged to show it if it is bad, and you will never

a “Soon he will leave us to seek that rest which becomes more and more grateful as years advance; but he leaves us with the affection and with the gratitude of the nation which he has served so well. Happy will any of you be who shall serve your country with his sincerity of purpose and his purity of heart. May the evening of his days be as tranquil as their noon has been glorious, and when to him shall come that inevitable hour which awaits us all, may it come only as rest comes to the wayfarer who is weary.”

succeed if you shoot so bad that you are ashamed to know it yourself.

—*Perry's Observations on Rifle Shooting.*

The firer will carefully note in his record the force and direction of the wind, and the allowance made for it in every target practice. A reference to such record will afford the surest guide for the allowance to be made for a wind of any given force and direction.

—*Laidley.*

In long range shooting, the ability to discern and calculate the force of the wind is nine-tenths of the battle.

Every one who desires to become expert should keep a careful register of his practice, both with military and target rifles, and tabulate and preserve the result of his experience. In keeping this, the direction of the wind should be indicated by the figures on the dial of a watch, corresponding to the point from which it blows (the watch being held so that the target is at XII), and its force should be carefully noted.

—*Wingate.*

Scores in all stated firing practice will be kept *in ink* at the range, and be properly authenticated by signatures and totals.

—*Par. 440, Laidley.*

Any erasure invalidates the register.

—*Par. 440, Laidley.*

It is by recalling the experiences of our own soldiers in our last great struggle that the career of marksmen, the soldiers of the future, may be best directed.

The historian tells us:

- b "In one of his poetic visions, the Prophet Ezekiel describes a plain, deserted and silent, on which lie innumerable scattered and dry bones. At the sound of his voice those shapeless remains come spontaneously together; the skeletons resume their forms and are covered anew with flesh; finally, a divine word from the lips of the inspired spectator restores them to life; and that wilderness, till then shrouded in the darkness of death, becomes peopled with an animated host."

Targets, Butts, and Telephones.

The Ordnance Department will provide targets, aiming stands, etc., for permanent posts garrisoned by more than one company, and where proper ranges can be had, with permanent targets, and all others with temporary targets. The Quartermaster's Department is charged with setting them up, preparing shelters, etc.

—G. O. 86, 1879.

421. A number of large characters, designating the target, is placed immediately over it, so as to be distinctly seen from the firing-stand. Where there is a natural butt, these numbers are planted on it. Roman characters, made with long strips of boards, whitewashed, are preferable, as being more readily distinguished at long distances.

—*Laidley.*

The expenditure of public money for iron targets is forbidden in this Division, and the use of light wooden frames covered with canvas, as targets, is enjoined, both on account of the economy, and because with the latter there is no danger from "spattering," and no loss of lead.

There must be thrown up a bank of earth behind and 9 feet higher than the target, or a butt of plank filled with sand to

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- b "The rapidity with which battalions of volunteers were recruited, assembled, and organized in the North may be likened to the sudden uprising of those mysterious legions taking form and life in the presence of the Hebrew prophet."
-

catch the bullets, and on the left of and in front of it a mantlet made of 2-inch plank $6\frac{1}{2}$ feet high, 7 feet wide and $1\frac{1}{2}$ feet thick at base and nine inches at top, and filled with sand, must be put up as a screen to the markers.

—*Circular Mil. Div. Pac. & Dept. Cal.*, August 15, 1878.

The Quartermaster's Department will supply all the necessary materials for constructing butts, firing stands, etc.

—*Par. 9, G. O. 53*, 1882.

The Signal Corps will furnish a sufficient number of telephones, and the Quartermaster's Department will furnish the necessary materials for butts, stands, etc.

—*Par. 9, G. O. 53*, 1882.

The suggestion in regard to altering the size of the targets is not, however, a wise one, so far, at least, as general practice is concerned. The point to be attained in marksmanship is to hit what you aim at, to "shoot close." The best target for this purpose is the round bull's-eye, with circular rings, as it shows just what is being done and the errors both in elevation and wind allowances. Theoretically, perhaps, a line shot on a "man target" would be the most fatal. But while this might be the case as against a single man standing up, as against a line of men behind a breast work, or kneeling or lying, exactness in elevation is of the most importance, and this is the kind of marks most likely to be presented in modern warfare. It is submitted that the point to be desired is to train your men to hit what they aim at. It is then for their officers to tell them whether they are to aim at the head or feet of the enemy and what elevation to use.

b “Those who then enlisted for three years were fully aware of the sort of life they were entering upon, and what perils they would have to encounter. Whether actuated by patriotism or the love of adventure, or influenced by the hope of gain, they one and all embraced their new profession with a firm and resolute determination. Good soldiers they were not—indeed they were scarcely soldiers—but they were honest in their desires to become such, and this was the surest way of attaining that end.

“At the close of the war the army numbered about 1,050,000 men. Such was its strength when it was disbanded.”

It must not be understood, however, that practice at anything but the regulation targets is depreciated. On the contrary, when men have, by practice at them, become reasonably proficient, they should be frequently exercised in firing under conditions as nearly assimilating those of actual warfare as possible.

—*Wingate.*

Figure Targets.

Too much praise cannot be bestowed on both the Austrian and Prussian method of teaching field firing. Accuracy on the target is a very good thing, but it is of little use if the men do not shoot well in war. Both armies lay much stress on familiarizing the soldier with the incidents of the modern infantry fight, and there cannot be any doubt that the fighting value of troops is enormously increased by exercises of this nature. The use of figure targets, moving* and disappearing targets, all help to this end; quickness of aim is learned, and the figure target must greatly help in training the soldier to fire accurately at his ordinary target in the field.

The organization of the Austrian ranges presents only one point which requires notice, viz., that the men fire from a shed, butts being erected at the various ranges.

—*Ordinance Note, No. 111.*

* These were used years ago by the late Sir G. Cathcart.

b "Enthusiasm furnished in the beginning what seemed to be an adequate supply of volunteers.

"But enthusiasm cannot be relied upon as a steady principle of national action. It is quickly excited, and, under the influence of adversity, as quickly subsides. Men were next obtained by the allurements of bounties, and that eventually failing of its purpose, they were taken by draft."

Eye.

In no treatise on rifle practice, as yet known, has the eye received the least consideration. In making this observation the author desires to invite criticism, and thereby induce experiment as to the most effective eye, and remarks as to the manner of preserving and improving the sight. It appears to be a fact that in warm weather, grey and blue eyes make better shooting than dark eyes. In pronounced cold weather the difference is not as marked, still very few dark-eyed men have achieved success as marksmen. All of the members of the American teams have been light-eyed men.

—*Perry's Observations on Rifle Shooting.*

Light.

* * * Some hints are necessary on the general topic. Could a rifleman select the peculiar light best adapted to his success and comfort, he would choose a dull gray light natural to a completely clouded, but not a threatening sky. A very bright light tires the eye and produces mirage. That light which permits the full power of a fine telescope is the best and most regular. Rain-light is preferable to sunlight. Sunlight calls for almost constant, and sometimes radical changes in elevation. An entire score may be fired without changing elevation in the absence of sunlight.

—*Perry's Observations on Rifle Shooting.*

b “The quality of the force thus arising changed with the changes of its origin. To the experienced military eye, the troops in the national service up to the epoch of the battle of Bull Run constituted an armed multitude, but not an army. Then it became evident that something more effective was necessary.”

Light and Atmosphere.

The condition of the light and atmosphere must be always remembered in long range shooting. On bright days the target is refracted, so as to apparently stand higher than its real position; consequently, theoretically a lower elevation is required than on a dull day. On the other hand, on a hot bright day the powder cakes and fouls in a rifle-barrel, retarding the bullet and requiring the elevation to be raised. A hot barrel, also, drops a bullet, and a clean barrel shoots high.

This is the explanation of the sudden droppings of the ball after a few shots, which sometimes seem so unaccountable. There is also greater friction in the barrel on a hot day, even when it is clean. Practically, therefore, at Creedmoor, on a hot, cloudless day, a higher elevation is required at long range than in gray, damp weather, the difference with military rifles shot without cleaning being as great as five points on the Vernier. Many riflemen fire a preliminary shot, so as to heat up the rifle-barrel a little before shooting in the match, and thus be able to fire all their shots of a uniform temperature, and some go up half a point after the first shot. If the weather be cold the effect of its being damp will not be noticed. Generally as the day becomes cooler the shots will be found to drop. The more moisture there is in the air the less elevation is required, the best shooting being done on the damp, gray days. The English text books on rifle practice insist that, in practice with open sights at 500 yards, if the target is suddenly lighted up by the sun, the marksman being in shade, he must lower his elevation two feet; while if he is in the sun and the target is overshadowed, he must raise his aim a similar distance.

b “Many months were consumed, and the skill of a trained officer was exhausted; unstinted supplies were lavished; but, though a great improvement was accomplished, perfection was very far from being reached. Not without the utmost difficulty, and after many disasters, were the political aspirations of officers and men extinguished.”

The refraction is much less in America, but alterations of bright light and shadow affect both the mirage and the eyesight.

They affect individuals differently, and their effect should be studied by those desirous of excelling.

For every increase of five degrees in temperature one point more elevation is required. In very cold weather the reverse is the case.

—*Wingate.*

Weather.

All other things being equal, a cloudy, moist, warm day gives [requires] lowest elevation, and a hot, bright day, or a very cold, bright day, highest elevation. In the first instance there is no mirage, the eye is comfortable and lubrication is freer—*i. e.*, the residuum of powder in the barrel is soft; on the hot day the eye is strained, mirage constant, and the powder cakes in the barrel, causing friction, and often causing the barrel to lead from the bullet.

—*Perry's Observations on Rifle Shooting.*

From numerous experiments * * * I am satisfied that the explosive power of gunpowder is very materially diminished by extreme degrees of cold, independent of the degree of atmospheric humidity. In shooting 200 yards on a perfectly clear, dry day, with the thermometer near zero, with my sights arranged at the height I had marked for that range in summer, the shots invariably fell from eight to twelve inches below the mark.

—*Cleveland's Hints to Riflemen.*

b "It was in the west that the army first became what an army ought to be—a mere centre of human force, capable of being directed with mathematical precision along any given line, and brought to bear irresistibly on any given point. In the judgment of a very high military authority, this degree of perfection was first manifested in General Grant's campaign from Grand Gulf to Vicksburg."

[The fall of the bullet is probably due to the greater density of the air, and consequently its greater resistance.]

Variations in the Atmospheric Resistance.

172. The air is subject to great changes in density, according to the season and locality. These variations modify its resistance, and affect the flight of the bullet in a marked degree.

173. The air becomes more rare as we ascend, and offers less resistance on high plateaux than in low valleys; warm air being expanded is lighter than cold air, and offers less resistance to the bullet. On this account the rear sight regulated for the summer is too low to be used in firing in the winter. A diminution in temperature of 35° will cause a fall of about 10 inches in the bullet at 200 yards range.

174. In firing at 1,000 yards, the variation caused by temperature alone, as the firing is done in very hot or cold weather, is equal to a distance of about 100 yards in the distance of the target. The humidity of the air varies its resistance perceptibly, and a diminution of the velocity and marked falling of the ball has been often remarked immediately after heavy rain. The retarding effect of rain on the flight of bullets is evident, for it imposes a liquid medium between the rifle and the target; the thickness of this medium, and consequently its resistance, increases with the velocity of the rain.

175. The wind has also a great effect upon the flight of the

b “To attain to this, an army must have lost all outward political thought; it must have implicit reliance on the mind which is guiding it. It must have complete cohesion in all its parts—from that tenacity results. Each soldier must thoroughly feel that, no matter how insignificant he, as a single individual, may be, he is absolutely sustained in what he is about to do by the unswerving and unfailing power of the whole force.”

bullet, and in 1,000 yards may deflect it from ten to twelve yards.

—*Laidley.*

Density of Air.

The resistance of the air to the flight of a projectile varies directly with its density. This density is usually expressed in the weight per cubic foot, or meter, in grains or grammes respectively. Besides height above the sea level, and latitude, three variables affect the weight, viz.: Barometric pressure, temperature, and moisture.

Tables have been constructed showing the effect of changes of air densities upon velocities. But they are somewhat intangible to the practical rifleman who does not concern himself much with “remaining velocities” and “times of flight.” He desires to know how much any change of surrounding conditions affects his elevation either in distance to be attained with a certain elevation marked on his sight—or, what changes are required from the normal elevation of his sight to attain a given range—or, in target practice, the equivalent change in height on the target when using the normal elevation scale.

I have endeavored to give the desired information in the following table, which is the result of computations based upon experiment showing elevations with changes in range and height on target due to variations of temperature and weight

b “The highest excellence is reached when the converse of this conception is attained, and the individual soldier considers that on him personally the safety and honor of the whole army may be depending. In the wars of Napoleon the Imperial Guard had been brought to this state. It is not by the pageantry of reviews that this grand ideal is reached; the perfect soldier, like his own weapon, must have passed through the ordeal of fire.”

of air. With ranges of less than 500 yards the differences are inappreciable.

TEMPERATURE.	WEIGHT OF AIR PER CUBIC FOOT IN GRAINS.	RANGE IN YARDS.					
		500	600	700	800	900	1000
104°	480	1° 19.2'	1° 41.0'	2° 5.0'	2° 30.2'	2° 59.3'	3° 30.4'
—11°	620	1° 27.0'	1° 51.6'	2° 20.0'	2° 52.0'	3° 26.9'	4° 5.1'
Mean change in minutes of elevation required for change of 4° of tem- perature.....		0.27'	0.36'	0.52'	0.75'	0.94'	1.19'
Corresponding change in inches on target.....		1.4	2.3	3.8	6.3	8.9	12.5
Corresponding change in yards of range.....		4.4	5.4	6.4	7.3	8.2	9.1

—*Extracts from Zalinski's Notes for the American International Rifle Team of 1883.*

Signal Flags, and Flags and Anemometers to Indicate the Direction and Force of the Wind.

To facilitate the observation of the direction of the wind, a flag should always be put in a suitable position before the firing commences.

—*Ordnance Note, No. 111.*

The effect of wind must also be attentively studied. * * *
When from the front, it will slightly reduce the speed of the

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- b "It was an essentially national army, both in sentiment and in the materials of which it was composed. The soldiers for the most part were animated by a sincere desire to serve the national cause, and the proportion of different elements which constituted its strength accurately represented the whole American nation."
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bullet, and when from the rear increase it, causing in the first instance a reduction, and in the latter an increase of the range.

There is considerable art, combined with judgment and memory, in the use of these flags. In my opinion, however, all adventitious aids should be rejected from target practice, if they are such as cannot be made available in actual service. It is of little advantage for a man to be able to hit a mark with moderate, or even with unerring precision, if he can make no use of his skill against an enemy, or is powerless to strike down a bounding stag at 100 or 150 yards.

—*The Rifle, and How to Use It.*

Two signal flags, 24x36 inches, for each target, and one streamer, 72x36 inches and 18 feet in length, for each 200 yards of range, not exceeding three in number, are supplied to posts.

—*G. O. 1, M. D. A., 1883.*

423. Flag-staffs should be erected at several different points where the danger signal, when hoisted, can be seen by passers-by, as an indication that firing is going on, and they must be careful to keep out of the way of danger. A staff is erected about the middle of the range, and provided with a vane, to show the direction of the wind. A socket is set in the ground in front of each target for the staff of a danger-flag, to be displayed by the marker, in case he wishes for any reason to arrest the firing. The staff is inclined, so that the flag cannot hang down against the staff, and thus escape observation.

The direction of the wind is indicated in the record by the numbers on the dial of a clock, IX representing a wind coming at right angles to the line of fire from the left, and III a cor-

b “The foot soldier displayed from the very first a great deal of personal bravery. The conflicts among the woods, where he was to fall unnoticed and to die without help, afforded the strongest evidence of this kind of courage, for they deprived him of that powerful incentive of all human action, the hope that his name would not die with him; it was, nevertheless, in these encounters, under the green shroud of the forest, that he exhibited all his firmness.”

responding one from the right, and so on with other numbers.

433. The instructor will be careful to see that before a rifle is fired the large red flag is displayed from the main staff, the markers and lookouts are at their several stations, and the range is clear of all loiterers or passers-by. Visitors must be in rear of the firing-stand, and not approach nearer than ten paces thereto.

442. To have the “*cease firing*” sounded, and his danger flag hoisted, as soon as a red flag is raised by the marker or lookout, and under no circumstances to proceed until both have been lowered and the “*commence firing*” sounded.

452. Several flag-staffs should be placed in such positions upon the range as to make the danger signal so conspicuous when hoisted upon them as to give notice to all passers-by that firing is going on.

Smaller flag-staffs should also be provided at each look-out station. A danger flag should also be provided for each firing point, to be elevated in answer to the danger signal, as hereafter explained.

453. Several flags should be erected above the top of the bank in rear of the target, during the practice, together with one midway upon the range, to show the direction of the wind.

454. A wooden socket should be set in the ground in front of each target, in which the marker should place the staff of his danger flag when obliged to leave his mantlet for any cause. This should be set at an angle, so as to display the flag clearly.

—Wingate.

b "But these personal qualities are not sufficient to impart to a body of troops that collective courage which inspires every man with the same spirit, and enables it to undertake with unanimity of purpose what no individual among those composing it could have attempted by himself. This distinctive trait of well-trained armies, which constitutes their superiority, is the result of long habits of discipline, and the influence of old and experienced cadres."

A gentle wind from the target requires a slight increase in the elevation, depending upon the distance to the target; a wind of equal force from the stand to the target will make very little difference, and may be disregarded, except in long ranges.

—*Laidley.*

It will be found by experience that a side wind frequently depresses the bullet, in addition to moving it sideways; that, while a front wind retards it and requires a higher elevation, a rear wind reduces the elevation, although not to the same extent; also, that the allowance required to be made for the wind increases with the distance.

While it is somewhat difficult to give correct tables of allowances for wind, the accompanying will prove of assistance. [See tables in Appendix.]

A gentle front wind requires an elevation of about one point; on a target rifle at 800 yards, if moderate, from two to three. A rear wind of the same character requires a little less.

The drift of the Springfield rifle, new model, 45 calibre, 70 grains powder and hardened bullet, weighing 405 grains, is 25 inches at 500 yards.

—*Wingate.*

Application having been made to First Lieutenant Zalinski, 5th Artillery, for information about an anemometer suitable for military posts, he has sent the drawings and specifications

b "Indeed, whatever may be his personal courage, the soldier who is unaccustomed to being under fire, placed between comrades who are as great novices as himself, and opposite to a large body of the enemy, very soon persuades himself that every musket in the enemy's ranks is leveled at his breast, forgetting that as many friendly weapons are by his side to sustain him. He may brave his peril, but will lack that entire confidence in the courage of his neighbors and the skill of his chiefs which tends to draw closer the ranks of a broken force, and urges the soldier to follow the lead of his officers in a desperate effort."

of a practical and easily constructed instrument, devised by Private Case, Company B, Engineer Battalion, which are published for the information of the military in this division. Lieutenant Zalinski remarks:

"The use of the anemometer upon the rifle range should be limited to the education of the perception or judgment of the rifleman to the value of varying conditions of the wind-pressure or velocity in order that he may finally judge, with an approximation to accuracy, without the aid of instruments. I consider, however, its preliminary use as essential in a rapid attainment of that end.

"I inclose a description of details of the Case model, which may aid the mechanic whom you may cause to make it. The instrument is, in fact, much more simple than may appear either from the drawing or the description. It can be made at any military post, with the exception, possibly, of the hollow axle and gearing for moving vane-dial index. These might be cast in San Francisco and furnished to posts. It might be well to test the scale by comparing it with velocities obtained by an ordinary Robinson anemometer. The instrument will, of course, partake of the disadvantage of all pressure-anemometers, the constant vibrations, but these are within limits, and the eye can readily detect a fair mean of the pressures.

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"In my efforts to discover a means of obtaining the deviating component of the wind without the use of special instruments,

b "The controlling influence of a severe discipline could not be felt among armies entirely new, where the epaulet did not carry with it that moral authority which is acquired by long service, and where the soldiers did not possess the assurance of men who have seen each other under trial."

it occurred to me that the passage of the smoke, carried by the movement of the air, might give me the desired data. The following method was tried and gave most satisfactory results:

"An observer was placed to leeward of a person firing, at a distance of 88 feet (*one sixtieth of a mile*) from the line of fire. Looking in a direction parallel to the line of fire, he notes the number of seconds which elapse from the firing to the passage of the first portion of the smoke across his line of sight. Dividing sixty by the number of *seconds* observed, the quotient will be the velocity per hour, in miles, of the deviating component. Where the smoke is quickly dispersed, or the wind but at a slight angle with the line of fire, 44 feet or 22 feet had best be taken and the number of seconds observed multiplied by 2 or 4, and used as in the case of 88 feet. I have compared the results thus obtained with the anemometer readings and the indications of the wind vane, and have found the former remarkably accurate."

—*Hdqrs. Mil. Div. Pac. & Dept. California, April 22, 1881.*

Wind-gauge.

Wind gauges are necessary, and should be made in hundredths of inches. Always screw or push the sight slide toward the wind. Above all, see to it that your sight slide is centered properly, that is, so that if there is no wind, the wind gauge stands at zero.

—*Perry's Observations on Rifle Shooting.*

b "At the very outset of the campaign, the inexperience of the Federal volunteers was made evident, even more on the march than on the battle-field. In fact, a body of troops which has had no practice, cannot, with the best intentions in the world, make a long march without straggling on the road. We shall see at the end of the war Sherman's soldiers traversing the half of a continent and conquering success through the vigor of their legs, while those of Grant carried a load of forty-five pounds on their shoulders."

Ranges.

450. To avoid the sun the targets must be placed at the northern end of the range. * * *

—*Wingate.*

When selection is possible, a practice ground should be chosen running north and south, the target being fixed at the northern extremity. It will thus always be in full light, and the shooter will have the sun at his back.

—*Hand Book for Hythe.*

Put the target in a direction N. E. and N. W., so that the sun will generally fall on the face of the target, and the firer have the sun on his back.

—*Ordnance Note, No. 111.*

In fitting up ranges they should be regarded mainly from a military stand-point. Long-range shooting is valuable, and to a certain extent should be encouraged. But the number of those who participate in it is so small that it is only occasionally that their contributions to a range will make up for the increased expense which is required to secure the distance they need for their practice. For military practice, six hundred yards is usually all that is required. If a longer distance is needed, the right to erect firing platforms in adjoining fields can usually be hired at a comparatively slight expense. * * *

—*Wingate.*

6 “But at the time of which we speak, they had not yet acquired that great art of the soldier which consists in bearing fatigue and taking rest in a systematic manner. They ate a great deal, did not know how to economize their food, adjusted their knapsacks clumsily, and could only carry two day’s rations. The first day’s march, which used up a great number, although very short, already filled the road with stragglers, who, while directing their steps towards the place assigned for the halt, did not consider themselves bound to keep up with their comrades, and whom a fresh spring of water or a shady spot would keep back; fortunately for the Federal armies, the Confederate guerrillas, in picking up such stragglers, did more towards putting a stop to this fatal habit than the severest orders of the day.”

Estimating Distances.

264. * * * And it is generally admitted that numerous trials and prolonged observations in the appreciation of distances can alone form the habit or *coup d’œil* which enables the soldier to estimate distances with sufficient accuracy. * * *

—Wingate.

When the soldier has made a certain amount of progress in judging distances on the flat, he is to be further instructed on rough and uneven ground, and to estimate the distances of soldiers partly behind cover and fully exposed. He is also to be taught how the period of the day, the nature of the lighting, and the various atmospheric influences affect the question. Thus, objects seem nearer the better they are lighted, the larger they are, the lighter their color, or the darker the background against which they stand; the purer the air, the more uniform the tint of the ground between them and the observer. On the other hand, they appear farther off when looking towards the sun, and *vice versa*. The clear cold air in winter, or after a thunder storm, makes objects seem nearer, while fog, powder-smoke, or the vapor caused by the heat of the sun, makes them look farther off. A smooth expanse, as fields

b "The wooded and rugged character of the country was suited to a mode of warfare that would not have admitted of great and rapid evolutions of a cavalry relying solely on the swiftness of their horses, if such cavalry had existed in America. The cavalry, however, at the outset of the war, confined itself to the complicated task of scouting for the armies, and acting as skirmishers. This service, although difficult for young troops, was not new to American horsemen, accustomed to an adventurous life which suited their spirit of personal enterprise."

covered with snow, corn-fields, or water, has the effect of rendering the distance apparently shorter. Ground falling towards the object has the same effect, and the contrary when it rises. * * *

—*Ordnance Note, No. 111.*

Range-Finding Practice.

By the persistent repetition of certain actions the faculties of a man can be trained to perform extraordinary feats. Some minds will excel in a particular field, while others may partly or wholly fail; but the average performance of a number of men may be brought to a high degree of excellence by careful and long-continued training. It is not wise to expect great results in a short time. These are generally produced by the accretion of small doings over a long period of time. The ideal soldier is one whose mental and physical faculties have been persistently and systematically trained until he is the superior of the average man. The business end of war is to be found at the muzzle of a shooting weapon. A soldier cannot use his shooting weapon to advantage without knowing the distance of the object at which he fires. To determine this distance he must either use a measuring instrument or his own mental faculties. It will not be necessary to enumerate the objections to the former. They are numerous as well as serious. Their proper function will probably develop to act as

b "If the volunteer cavalry did not always possess the just instinct of war, nor that abiding vigilance indispensable in the presence of an enemy, they made up these deficiencies by their intelligence and daring; a great number of little engagements afforded them opportunities to show that the inventive mind of the Americans was never at fault when it became necessary to devise a stratagem or to make combinations for some bold stroke. At a later period the importance of the cavalry was developed by the new part assigned to it in those raids or large independent expeditions, of which we shall speak hereafter."

aids in training men to estimate distances by using their physical and mental faculties.

The military authorities have control over enlisted men for periods of five years and upwards; over commissioned officers for very long periods. There can be little doubt that if both were systematically and persistently practiced in the estimation of distances the effectiveness of battle-fire would be largely increased. A great many difficulties will attend the accomplishment of this end, but they *must be overcome*. As soldiers, responsible to our government for the expenditure of vast quantities of energy in times of trial and distress, we cannot afford the stigma that goes with the enormous percentage of wasted shots in battle.

The art of measuring lines consists in applying one of standard length to any given line and counting the number of times the standard can be repeated upon it. For a man to estimate a distance he must have a standard distance fixed in his mind. Applying this upon a line to be estimated, he must exercise his faculties in judging how many times the one contains the other. In training for range-finding the first thing to do is to select a standard distance, and by unwearying repetition, fix it in the mind so that it can be laid off anywhere, at any time, and in any direction, with reasonable precision. Every post has, or ought to have, a target range, at which the men practice during their whole term of service. At this the 600-yards range is one of considerable

b “The volunteer artillery could not find amid the American forests favorable ground and those large open spaces where it can operate with most effect. It was, however, from the first day in large force and constantly employed, because this arm of the service had, from the very first, been highly popular among the volunteers, while the infantry, before it had been well trained, did not like to move without feeling itself supported by some guns, even for a simple reconnaissance.”

importance, and, therefore, 600 yards can, with advantage, be taken as a standard to fix in the mind. By systematic and persistent practice this standard can be fixed in the minds of most of the officers and men. Officers and non-commissioned officers should receive the utmost attention in this practice. No attempt should be made in estimating other distances until this has become stamped upon the minds of most of the men under drill. The drill might consist in taking the men from point to point, and calling upon them one by one to place a marker at 600 yards in different directions. The instructor to measure each distance so selected with a stadia, the rod of which would be carried and held by the marker. After all had laid off the distance the instructor could announce the result. The marker could be mounted. In the same manner that a soldier, after long training, instinctively takes a step 28 inches long, he could also instinctively lay off a distance of 600 yards pretty closely. Twelve years after leaving the Military Academy I one day gave myself up to the instinct of marching, and walked over a measured half-mile, counting the steps. Then comparing the number of steps with the distance, I was surprised to find that the average length of each step was 28 inches and a very small fraction. The next step would be to train the men to lay off 1,200 yards, then 1,800 yards, then 2,400 yards, then 3,000 yards. Finally, the distance of any object, in any direction, up to 3,000 yards, could be determined by judgment and then verified by some sort of measurement. A good way of doing this would be to

b "If the position of one of those advanced batteries displeased the enemy, or if one of the two adversaries desired to try some newly invented projectile, the first fire was sure to bring on a lively cannonade, which the distance and the small number of combatants generally rendered harmless. But when the rattling peals of musketry announced a serious engagement, the artillery of the volunteers, worthy rival of that of the regulars, would always rush across woods and swamps to seek a position where the danger was greatest, even at the risk of being abandoned by the raw troops who were its only support."

measure a convenient base line (less than 1,500 feet) with a stadia, and measure the angles at its extremities with one or two pocket sextants reading to minutes. By the use of a moveable wire by a micrometer screw fixed to a small pocket telescope (that of the sextant would answer), such stadia measurements can be made, after some practice, with considerable accuracy.

—Major W. A. Jones, *Engineer Corps*.

Position of Riflemen and Holding the Rifle.

In respect to the manner of holding the rifle, many riflemen, whose physical conformation permits, find that up to 300 yards their firing is best from a standing position, but not necessarily that prescribed by tactics, for most men obtain better results by placing their feet 15 to 20 inches apart, stiffening the legs to rigidity, extending the left arm nearly or even fully, and with both hands pressing the butt against the shoulder, elevating the right shoulder when firing at and under 200 yards, to bring the line of sight up to the eye, and keeping the body upright. The distribution of the points of support to the rifle by this full extension of the left arm, the increased force with which it can then be pressed against the shoulder, places the rifle, when thus aimed, in the firmest position which the human frame will allow.

b “We have dwelt upon the defects of the American volunteers because they were the cause of their first reverses, and because, in exposing them, we are only exalting the merit of those men who had so much to learn in order to become capable of accomplishing the great task they had undertaken, and who succeeded by dint of perseverance and devotion.”

Attention is again invited to Circular from these Headquarters of April 4, 1879, in which riflemen are advised to extend the thumb of the right hand along, instead of across, the small of the stock when aiming. Not only is the nose thus relieved from danger of a blow by the recoil of the rifle, but by grasping the piece with the thumb thus extended, it can be more quickly and correctly sighted, while at the same time more mobility is given to the trigger finger. The advantage of this thumb extension comes from the fact that thereby is best secured that opposition of the thumb and forefinger which gives the hand its wonderful power of manipulation. It is true, some hold the piece very differently and shoot well, but that is only because men with good eyes and nerves will shoot skillfully from any position. Were they to adopt the better position, their marksmanship would be improved.

For men with long arms and fingers, to use the middle finger to pull the trigger is allowable, simply because unavoidable. They are perhaps compelled to this by the shortness of the stock. But the method is certainly bad; for the greater mobility and sensitiveness of the forefinger indicates it as the one which can best apply the graduated force necessary to discharge the piece.

—*Circular Mil. Div. Pac. & Dept. Cal., Oct. 31, 1879.*

126. Raise the rifle smartly in front of the right shoulder to the full extent of the left arm, without moving the body, head, or eye; the arms to move close to the body, the breech sight to be upright, barrel nearly horizontal and pointing a few inches below the mark; the eyes are fixed upon the object, the forefinger inside the trigger-guard, both elbows inclined downward.

b "One trait in their character redeemed all these defects, and already displayed, under the garb of these inexperienced men, those valiant champions who, at the end of the war, carried the enemy's strong works by assault; they went under fire more resolutely the second time than the first."

127. Press the piece smartly with both hands against the hollow of the shoulder, which must neither be allowed to give way nor pressed forward or raised to meet it; the left elbow at the same time being brought as far under the rifle as is possible without assuming an unnatural position, the right elbow slightly advanced, being nearly square with the right shoulder. The centre (or rather the upper than lower) part of the butt to be pressed firmly against the shoulder with the left hand without touching the collar-bone, the top of the butt being as nearly as possible with the top of the shoulder. The forefinger will be placed around the trigger like a hook, but without pressing it. * * * the head is bent slightly forward and to the right, without straining the neck, the left eye closed, and the right directed through the notch of the back sight, at a point about a foot underneath the bull's-eye, and the point of the foresight aligned on that spot.

At distances over 300 yards any position is allowed. This means any position that can be taken on level ground. The standing position depends so much on the "personal equation" of the marksman as to prevent that extreme nicety of aim required in long range firing. It also renders the rifleman liable to be swerved by the wind. It is, therefore, never used in long range matches.

With most men the position is steadier if the toe of the butt is held well up on the shoulder, so that the cheek can rest against the side of the stock.

The Hythe school directs that the rifle be pressed against the shoulder with the left hand, the right holding the stock lightly.

— *Wingate.*

b “Participation in danger, the loss of their comrades, the sufferings and hardship of war, serve to strengthen the courage and increase the self-possession of the volunteers whom a patriotic duty took from the occupations of civil life. Iron, when pure and of good quality, acquires shape and strength under the repeated blows of the blacksmith hammer, while metal adulterated with bad alloys splits and soon flies to pieces.”

Stand erect on both hips, feet conveniently apart and firmly planted.

Press the butt against the shoulder with both hands, the left hand grasping the piece firmly at or in front of the lower band. With some, the arm extended works still better.

—*Perry's Observations on Rifle Shooting.*

A i m i n g .

145. Place the *middle* of the forefinger upon the curve of the trigger. Draw a moderately deep inhalation, and restrain the breathing until the trigger is pulled. Then raise the muzzle with the left hand with a steady, perpendicular motion, till the point of the fore-sight covers the centre of the object and is in line with it and with the notch of the back sight. At the precise instant when it is felt that the line is true, *pinch* or press the trigger with a steady contraction of the finger, keeping the eye still directed upon the bull's-eye, *and observing what movement, if any, has been imparted to the piece by the pull of the trigger.* * * *

—*Wingate.*

If the firer finds any difficulty in aiming, he comes down from the present position of aim, rests a moment or two, and then aims again. While the man has his rifle at the present, he is not to be corrected or disturbed in any way. In the case of beginners or untrained men, they may be ordered to come

b “In command of such an army Grant’s hour at last arrived. The Army of the Potomac, that had been so often checked but never broken or overcome, moved forward to victory. One week of prodigious fighting and marching and the enemy yielded to the persistence of Grant’s veterans, and the old flag once more floated over the whole land.

“The Lieutenant General, having consummated his last and most brilliant campaign, quietly returned to Washington without entering, or even having seen, the city his genius had conquered.”

down to the loading position, and then their faults shortly pointed out to them.

—*Ordnance Note, No. 111.*

Practice in aiming and pulling off without cartridges should always be had at the firing point before firing. The sights should be so arranged, temporarily for this practice, that after pulling off the aim can still be maintained; any deviation on account of firing can thus be noticed.

—*Perry’s Observations on Rifle Shooting.*

* * * The hammer, as a rule, will rest on the firing-pin, and should never be left at full-cock. If, after cocking, the intention of firing shall be deferred, bring the hammer to the half-cock notch. Care will be taken that the front sight is not bruised, marred, or in any way injured, and that the sight-leaf is close down on the base.

—*Laidley.*

Captain Cushing’s Aiming Device.

Consists of a split tube fitting around the muzzle of a rifle, forward of the front sight, and loose enough to allow of a circular adjustment around the barrel; to this tube is hinged a metal cylinder, with a movement to the front and rear, on which is fitted a tube, at the extremity of which is a circular mirror; this tube has a circular adjustment around the bar.

b “Apply to General Grant what test you will, measure him by the magnitude of the obstacles he has surmounted, by the value of the positions he has gained, by the fame of the antagonists over whom he has triumphed, by the achievements of his most illustrious co-workers, by the sureness with which he directs his indomitable energy to the vital point which is the key to a vast field of operations; or by that supreme test of consummate ability, the absolute completeness of his results, and he fully vindicates his claim to stand next after Napoleon and Wellington among the great soldiers of this century, if not on a level with the latter.”

In the center of the mirror is a round black patch of paint or paper. By these adjustments the mirror can be turned in any direction so as to receive a ray of light from the sun or a lamp, which, reflected by the mirror, arranged as mentioned above, will throw a black shadow (of the patch), surrounded by light, on a small target on a wall at a point corresponding with that where the line of sight pierces; thus enabling the instructor, by the steadiness or otherwise of the reflection, to determine and correct errors in a recruit's method of firing.

This is an admirable device for the first instruction of recruits and incorrigibly bad shots. Every company commander should have one, in order that he may know what the fault of the firer is, whether in aiming or in pulling off. So soon as the difficulty the firer has to contend with is known to the instructor it is always easy to correct it.

—*Headqrs. Mil. Div. Pacific.*

Sighting.

In rifle shooting most persons find it easier to aim with the right eye alone than with both eyes open; the latter, however, is a far better mode of shooting at moving objects and at short ranges, and the art is not difficult to acquire after some few trials. The chief requisite is to bend the neck, holding the head well over, and pressing the cheek firmly against the stock,

b “Ostentation and display were strangers to his nature; he was approachable by all; no array of Prætorian Guards hedged him about and told you to stand back; but an open, undisguised western welcome greeted you at his headquarters.

“His diffidence and modesty as commander of one of the largest armies ever organized by a great nation were only equalled by his magnanimity as the chosen ruler of that nation.”

so that the muzzle-sight shall be exactly opposite the centre of the forehead. The young rifleman should not merely content himself with firing now and then at a target in the summer; he should practice as well in stormy weather, in rain and during snow. By that means he will learn how to make allowance for the force of the wind, which always exerts much influence over the direction of the bullet, especially at long ranges, and also for the peculiar refraction caused both by rain and snow. It will be found, too, that it is more difficult to shoot with accuracy over water and over tracts of swampy land, than over level sands or sward.

—*The Rifle, and How to Use It.*

Shutting one eye is getting out of date, as it develops one eye to the exclusion of the other, and causes nervous twitching, especially in hot weather.

A leather screen or other contrivance will shut off its vision, so the eye not in use can remain open.

—*Perry's Observations on Rifle Shooting.*

It is not only unnecessary, but will be found by most persons an absolute disadvantage, to shut one eye when firing.

The sight can be more quickly taken, and with equal accuracy and with less strain upon the vision, with both eyes open. Anyone, however, preferring to sight with the vision of one eye excluded, will find that placing a screen over the eye is better than closing it.

—“*Suggestions for Riflemen when Preparing Themselves for Creedmoor,*” issued from Hdqrs. Mil. Div. Pac. & Dept. Cal.

b "It has been said by Milton of one of the world's great soldiers and statesmen: 'Many men have been without wit, without eloquence, who yet had the wisdom to devise and the courage to perform that which they lacked language to explain. Such men often, in troubled times, have worked out the deliverance of nations and their own greatness not by logic, but by warmness in success, by calmness in danger, by firm and stubborn resolution in all adversity. The hearts of men are their books, events are their tutors, great actions are their eloquence.'

* * * *

His own deeds shall avouch him for a statesman, a great soldier, a true lover of his country, a merciful and generous conqueror."

Elevation.

In practice, after the first four shots a rifle barrel fouls if it be not wiped, so as to cause the shots to drop slightly, particularly on a hot, bright day. This must be kept in mind, and the elevation raised, if required. A one-hundredth on the Vernier will be enough at a time.

Too much care cannot be taken with the first shot, especially in a match. With open sights it is of the utmost importance that the marksman should know, when about to deliver his second shot, the exact portion of the fore-sight seen through the U when the first shot was fired, together with the exact spot upon the target where the top of the fore-sight was held.

The particulars of previous shots should always be remembered; but this is of more importance at first, for the reason that the elevation and aim might be altered unnecessarily, and the advantage of the previous shot lost, should the result be unsatisfactory.

After having made several good shots, the aim or elevation should not be changed because one shot seems to go wild. If the first shot, however, is not satisfactory, the sighting for the second should be changed.

With military rifles the sights should not be altered for a slight deviation, but a slightly different aim taken.

b "It was May twenty-fourth—a bright, beautiful day—that the famous army whose drums had been heard from the Ohio to the sea, and back again to the Potomac, passed before the President, the Cabinet, and hundreds of thousands of spectators drawn to Washington to witness the reviews of the armies of the Potomac and of the West—the most magnificent military spectacles ever witnessed on the American continent."

Every man should invariably shoot with his own rifle, or he can expect to learn but very little.

—*Wingate.*

In keeping your elevations, if you notice that a shot is a little high or low, be slow to change, unless you are sure you held the rifle perfect. *It is best to hold the rifle perfect every time*; if it takes ten minutes to get up, get rested and try it over again. If a shot hits the bottom or top of the bull's-eye, it is safe to change $\frac{1}{2}$ point up or down. If a shot hits above or below the centre circle, one point can be allowed safely, unless the error comes from light and shade, and the original conditions are restored. Be very careful of *the next shot always*, so as to make sure of the necessity of more alteration.

—*Perry's Observations on Rifle Shooting.*

The Pull of the Trigger.

Most American and German riflemen who have been accustomed to a hair trigger, or at most to a pull of less than three pounds, regard it as impossible to do good shooting with anything heavier. This was at first the idea at Creedmoor; but experience has worked a change. While a trigger-pull of six pounds gives an advantage over one of ten, it is so slight as not to be thought much of, and many of the best military shots at Creedmoor care so little how much pull their rifles require as not to trouble themselves to have them eased up, provided their pull is not over ten pounds.

b “What a glorious pageant! What cheers rent the air when ‘the first soldier of the Union,’ as Sherman has been called, rode along Pennsylvania avenue, at the head of those invincible veterans who had marched victoriously through eight of the rebellious States!”

Certainly the difference between the off-hand shooting with military and sporting rifles, in the matches, will be seen to be very slight, and owing far more to the finer sights of the sporting rifle than to its lighter trigger pull.

—*Wingate.*

When about to fire, inflate the lungs moderately, and then hold your breath till the bullet is gone. The pressure of the finger on the trigger should be very slow and steady, so that when the hammer trips, the steadiness of the rifle is not disturbed.

—*Perry's Observations on Rifle Shooting.*

Just before the muzzle-sight is made to cut the centre of the bull's-eye, the breath should be held; in pulling the trigger, the forefinger alone should act, the arm and wrist being stationary, and there should indeed be no movement whatever of the body until the precise result of the shot has been noted. Nothing accustoms the shooter more to steadiness than this habit of holding the rifle to the shoulder after he has delivered his fire.

—*The Rifle, and How to Use It.*

297. Each man decides for himself when to pull the trigger. He should be taught that it is best to pull the trigger when the aim is first caught, as this is apt to be the best, but all undue haste must be discouraged as tending to carelessness.

—*Laidley.*

The minimum pull of the trigger, in competitions with military rifles, is six pounds.

—*Page 205, Appendix, Laidley.*

b “With what an easy, careless, accurate swing, the gaunt veterans move forward! How weather-beaten and bronzed, and how dingy, as if the smoke of numberless battle-fields had dyed their garments.”

Kneeling Position.

In kneeling, the difficulty is almost entirely one of position. Unless regularly drilled, even a good shot makes a poor score in this position, while a poor shot, who is at home in it, will make a good one. So, also, accuracy in firing when lying down can only be secured by one accustomed to the position. * * *

If the left elbow is placed directly upon the knee, two round surfaces are brought together, and the position is unsteady. But by sitting firmly upon the heel and placing the left elbow well in front of the knee, a pretty good rest is obtained. Still, the position depends upon so many parts of the body that it is seldom used in matches. It is valuable, however, for military practice, from the rapidity with which the soldier can change his position, and also because it permits of a fire when in double ranks—for which reason it is prescribed in the manual in practice between 300 and 400 yards. In the English Army, when the fire is in two ranks, the front rank always kneels, not only to obtain a steadier position, but to get them out of the way of the rear rank, and thus secure a more rapid and accurate fire.—*Wingate.*

Sitting Position.

The proper mode of shooting sitting, in which position many succeed tolerably well, is with the left leg in line with the target and the right almost at right angles to it. The elbows are placed just inside the knee, and the body leaned slightly forward. With a small elevation to sit on, the position is greatly improved. The recoil of the rifle is felt less in this position than when lying.—*Wingate.*

b “And the flags they carried ! Terrible is an army with banners— if those banners are torn by the shot and shell of a hundred battle-fields.”

Firing Lying Down.

In firing lying down with the face to the target, the body should be at an angle of at least 30° with the line of sight, so that the recoil of the rifle will be received obliquely. The legs should be flared and toes extended, and the body settled as low as possible.

—“*Suggestions for Riflemen when Preparing Themselves for Creedmoor,*” issued from Hdqrs. Mil. Div. Pac. & Dept. Cal.

The favorite position for long range firing, particularly with a military rifle, is that of a “skirmisher lying.”

In taking this position, the legs should be well separated, the toes being turned outward so as to cause the body to hug the ground as closely as possible. The left elbow should be kept almost straight under the rifle (if placed too far to the left, it strains the wrist), and the barrel grasped firmly with the left hand. The right elbow should be placed a little to the right. To prevent the elbows separating, as they are naturally inclined to do on hard ground, a depression may be made in the ground with the heel of the boot, or something soft placed under them. The hips should be twisted to the left, and the right shoulder well raised to keep the collar bone out of the way and afford a firm seat for the rifle butt, which must be held closely against it.

—*Wingate.*

The prone position should be thoroughly studied. Short-armed men may not be able to take the position recommended by the author, but they should approach as near to it as possible.

If the target is at the north, face the north-east, and lie down in that direction. strike the toes well into the ground,

b “The country was proud of them and of their gallant deeds, and the review was the most wonderful panorama in American history, as the quiet dispersion of a million of well-seasoned soldiers, many of them scarred veterans, who new

‘The stern joy which warriors feel,
In foemen worthy of their steel,’

who laid aside their swords, to return to the pursuits of peace, was one of the greatest and most significant events in the modern history of the world.”

and settle the body down as low as possible; throw the left elbow over to the right, grasp the piece with the left hand from underneath, the fingers reaching as far round as possible; back of the hand to the right.

As the muzzle of the piece is carried over to the left, to its proper allignment, it puts every muscle of the left arm on tension, and consequently there is no joint to wriggle or shake. The butt should be placed against the right shoulder, passing along and by the collar bone. The right arm is free to manipulate the piece.

—*Perry's Observations on Rifle Shooting.*

There is nothing that spoils good shooting like shivering with cold.

The rifleman should always be provided with a rubber blanket to lie upon in long range shooting. A heavy woolen rug will also add greatly to his comfort, at almost all times, by keeping off the chill of the ground.

The Amateur Rifle Club, during their practice and in their matches, provide for each firing point a strip of cocoa matting 4 by 6 ft., with a cocoa door-mat for a rest for the elbows. A heavy cocoa mat, such as is used for hotel doors, is preferable to matting, as being thicker.

—*Wingate.*

In firing lying down, whether the head or feet be towards the target will depend on circumstances and should be left to the soldier to determine.

—*Letter Hdqrs. of the Army, A. G. O., July 26, 1883.*

b "When in after years our children shall speak of the crowning glory of their house, they will pass the grave effigies of jurists, statesmen, divines, and great merchants, and will point out with pride the portrait of a simple soldier, or subaltern officer, as 'one of Sherman's men.'"

What to do When Commencing to Fire, and How to Get on the Target.

Before firing at long range the rifleman should make a careful scrutiny of the wind, light, and atmosphere, and enter them on his register. He should then, from his record of previous practice, calculate what elevation and allowance for wind is required. If without such a record, he should reason it out about as follows: "The wind is a fresh breeze from IX (or left)—this will require four points on the wind gauge, and also one point extra elevation. The weather is damp and sky cloudy—this will require two points reduction in elevation. The approximate elevation given with my rifle is $2^{\circ} 5'$; the elevation for to-day will, therefore, be $2^{\circ} 4'$, with four points for left wind."

Having fired, the result, if a hit, will enable him to verify and correct his calculations, provided he is steady. If he has missed altogether, he must decide whether the error was in himself or in his elevation, or in his allowance for wind.

If the elevation is wrong (as is most likely to be the case), he should raise (or lower) his elevation a little less than half the height of the target (or three feet), allowing a little margin for an error in holding, which will bring him on, if his ball has just gone over or under. If still a miss, he should, if in the dark as to the difficulty, lower (or raise) his elevation the same distance below the first shot.

If still a miss, go up a little less than six feet from the original elevation, and then come down the same distance at the next shot. By "feeling for the target" in this way, first up, then down, a very few shots will be required to "get on."

b "No prouder title will be known in the land fifty years hence. All other ancestors shall give precedence to the soldier who accompanied Sherman on that great march, which, till men cease from slaying and wars become mere matters of history, will ever be held up as an illustration of the highest daring combined with the most prudent forethought."

Care must be taken not to be too firm in adhering to a theory. If after a fair trial it does not give success, it should be abandoned. The proper allowance for the wind is ascertained, in case of doubt, in a similar manner—*i. e.*, by "holding off" more than at the first shot, and then reducing the allowance, and so alternating until the target is struck.

—Wingate.

Zalinski's Method for Determining Wind Allowance for Springfield Rifle.

MEMORANDA.

Moving the leaf on rear sight *one point* will move the shot on the target—

	6 inches, if firing at 100 yards.
11	" " 200 yards.
16 $\frac{1}{2}$	" " 300 yards.
22	" " 400 yards.
28	" " 500 yards.
33	" " 600 yards.
38	" " 700 yards.
43	" " 800 yards.
48	" " 900 yards.
53	" " 1000 yards.

It will be observed that these values are, for long distances, the multiples of the range and 5 plus 3: for example, the value of a point is, practically, at

1000 yards, $10 \times 5 + 3 = 53$.

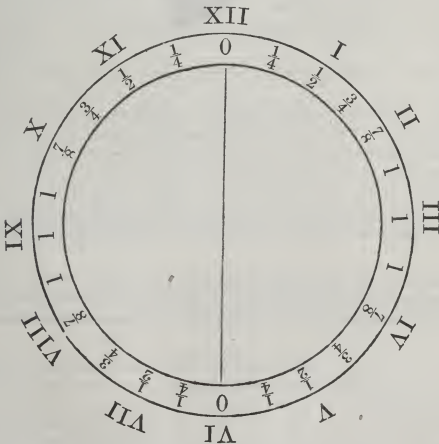
900 yards, $9 \times 5 + 3 = 48$.

Increasing the elevation *twenty-five* yards will raise the shot on the target—

	6 inches, if firing at 200 yards.
about 8	" " 300 yards.
" 10	" " 400 yards.
" 13	" " 500 yards.
" 20	" " 600 yards.

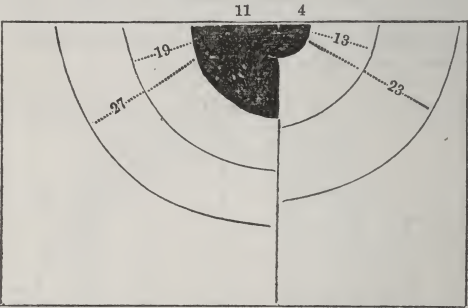
- b "And while referring with national pride to the illustrious soldiers whom the valor and devotion of the volunteers enabled to accomplish so much for the perpetuation of the Government, the historian recalls the name of Washington, who, as a chieftain, sustains comparison with any other of ancient or modern time. No one has ever denied to Washington the possession of the highest degree of physical and moral courage; no one has ever accused him of missing to strike a bold blow; no one has ever pointed out a want of vigor in the moment of action, or of forethought in the plans of his campaigns; in short, no one has alleged a fact from which it can be made even probable that Napoleon or Cæsar, working with his means and on his field of action, could have wrought greater or better results than he did, or that, if he had been placed on a field of action, and with a command of means like theirs, he would have shown himself unequal to the position."

DIAL showing how much of the force of the wind is felt by the shot in driving it off its course; from which it will be observed that wind at only 15 degrees to the right or left of the plane of fire, whether moving to the front or rear, will produce one fourth as much effect in deviating the bullet as if it blew at right angles thereto; at 30 degrees, half as much.



b “We cannot see, in surveying the military career of Washington, the American Fabius, as he has been called, where he committed a single error; and of whom Guizot has said: ‘Of all great men, he was the most virtuous and the most fortunate.’ In a letter written to Lafayette soon after leaving the tented field, he says, as now Grant and Sherman may say: ‘At length I am become a private citizen, and under the shadow of my own vine and my fig-tree, free from the bustle of a camp and the busy scenes of public life, I am relieving myself with those tranquil enjoyments of which the soldier, who is ever in pursuit of fame; the statesman, whose watchful days and sleepless nights are spent in devising schemes, the welfare of his own, perhaps the ruin of other countries, as if this globe was insufficient for us all; and the courtier, who is always watching the countenance of his prince in hopes of catching a gracious smile, can have very little conception.’”

FIGURE showing the distances, in inches, from the centre of the bull's-eye to the different rings:



Target for 400, 500, and 600 yards. | For 200 and 300 yards.

TABLE [1] showing the drift of the bullet in inches. This is always to the right with the Springfield rifle, and is due to the spin that the grooves give to the ball:

	YARDS.									
	100	200	300	400	500	600	700	800	900	1000
Drift of 405-grain bullet.....	.5	1.3	3.05	7.	12.35	19.50	28.65	..	..	..
Drift of 500-grain bullet.....	1.29	3.	5.1	7.8	11.45	16.1	21.9	28.35	35.7	43.2

Drift must be added to wind allowances if the wind is from the left, and deducted if the wind is from the right.

For practical purposes, the drift may be assumed to be equivalent to two miles of wind, from the left, at all ranges.

6 “I have not only retired from all public employments, but I am retiring within myself, and shall be able to view the solitary walk, and tread the paths of private life with a heartfelt satisfaction. Envious of none, I am determined to be pleased with all, and this, my dear friend, being the order of my march, I will move gently down the stream of life, until I sleep with my fathers.”

WITH the data heretofore given, the rifleman should, *after the first shot*, be at no loss to know just what corrections to make. If the shot was a close III or IX o'clock inner at 500 yards,—that is, 20 inches from and to the right or left of the centre of the bull's eye,—he would change the rear sight $\frac{3}{4}$ of a point; if a close VI or XII o'clock inner at 600 yards,—that is, 20 inches above or below the centre of the bull's-eye,—he would change the elevation 25 yards; if a V o'clock outer at 600 yards, he would change the rear sight 1 point and increase the elevation 33 yards.

ZALINSKI'S METHOD,

however, is for use in getting upon the target at the *first shot*.

For this it is necessary to know the direction and velocity or speed of the wind.

The direction from which the wind blows in respect to the plane of fire is easily determined, and the velocity of the wind may be taken from the instrument made for the purpose, or by practice may be judged very closely.

Let us suppose the direction and force of the wind to have been ascertained.

RULE—Multiply the force of the wind by the fraction found in the dial under the direction of the wind; if the wind is from the left, add two (2) to the product to allow for drift; if it is from the right, *subtract* two (2) from the product, to allow for drift.

Multiply this result by the fraction in the following table [2] which corresponds to the range.

The product will be the number of “points” of sight required.

For instance, to fire at 500 yards with a I o'clock wind blowing at 10 miles an hour! The dial shows that the ball will feel one half the effect of this wind—that is, 5 miles. Subtract 2 from 5, for the drift—multiply the remainder, 3, by the fraction given in ZALINSKI'S TABLE [2] for this range (which is $\frac{1}{5}$), and the product, $\frac{3}{5}$, is the portion of a point of sight necessary to take, to the right, to counteract the deflection due to the wind.

Zalinski's Table [2] of Multipliers.

For 500-grain Bullet.	Yards.									
	100	200	300	400	500	600	700	800	900	1000
Allowance to be made for each mile of wind, acting at right angles to the line of fire, expressed in fractions of a point of sight.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{2}{5}$	$\frac{1}{2}$	$\frac{2}{7}$	$\frac{1}{3}$	$\frac{2}{9}$	$\frac{1}{5}$

c *Maxims of Napoleon, and comments thereon.*

“We have no example of soldiers being wanting in their duty, in the most desperate situations, where they are commanded by officers of approved resolution.”

Other Examples.

Velocity of Wind.	Direction of Wind.	Range—Yards.	Sight Allowance.			
10 miles.	1 o'clock.	700	5 less	2 eq. 3.	3 mult. $\frac{2}{3}$ eq. $\frac{2}{3}$ points required.	
11 miles.	III $\frac{1}{2}$ o'clock.	400	11 less	2 eq. 9.	9 mult. $\frac{1}{3}$ eq. $\frac{1}{3}$ eq. $1\frac{1}{2}$ points req'd.	
16 miles.	VI $\frac{1}{2}$ o'clock.	300	4 plus	2 eq. 6.	6 mult. $\frac{1}{3}$ eq. $\frac{1}{3}$ points required.	
8 miles.	X o'clock.	600	7 plus	2 eq. 9.	9 mult. $\frac{1}{3}$ eq. $\frac{1}{3}$ eq. $2\frac{1}{2}$ points req'd.	

TABLE [3] showing the distance on the target, in inches, from the centre of the “bull’s-eye,” for which allowance must be made on account of the force of the wind, and the number of points which the sight must be moved to provide therefor, using the buckhorn sight and Bull screw. One turn of the Bull screw is equal to two-thirds of a point.

YARDS.	5 MILES.		10 MILES.			15 MILES.				20 MILES.				25 MILES.			
	Inches.	Points.	Inches.	Points.	Turns.	Inches.	Points.	Turns.	Lay off—feet.	Inches.	Points.	Turns.	Lay off—feet.	Inches.	Points.	Turns.	Lay off—feet.
200	7.5	.68	15.	1.36	..	22.5	2.04	..	..	30.	2.50	..	..	37.5	2.50	..	1.—
300	12.5	.75	25.	1.49	..	37.5	2.24	..	..	50.	2.50	..	1.—	62.5	2.50	..	2.—
400	20.	.90	40.	1.80	..	60.	2.50	..	..	80.	2.50	..	2+.	100.	2.50	..	3.—
500	30.	1.08	60.	2.15	..	90.	2.50	1.17	..	120.	2.50	2.90	..	150.	2.50	4.50	..
600	40.	1.22	80.	2.44	..	120.	2.50	1.87	..	160.	2.50	3.83	..	200.	2.50	4.50	2+.
700	55.	1.46	110.	2.50	.64	165.	2.50	3.02	..	220.	2.50	4.50	2.—	275.	2.50	4.50	6+.
800	75.	1.76	150.	2.50	1.66	225.	2.50	4.50	..	300.	2.50	4.50	6+.	375.	2.50	4.50	12+.
900	100.	2.1	200.	2.50	2.71	300.	2.50	4.50	4.—	400.	2.50	4.50	12+.	500.	2.50	4.50	20+.
1000	130.	2.45	260.	2.50	3.83	390.	2.50	4.50	9.	500.	2.50	4.50	20.	650.	2.50	4.50	30+.

DAINGEROUS SPACE.—Infantry against Infantry.

RANGE—Yards.	ASCENDING BRANCH OF TRAJECTORY.	DESCENDING BRANCH OF TRAJECTORY.		MAXIMUM CONTINUOUS DANGEROUS SPACE.	TOTAL.
		Before the Object.	Beyond the Object.		
100	All yards....	All yards....	72.5 yards....	172.5 yds....	172.5 yards.
200	“ “....	“ “....	70 “....	270 “....	270 “
300	40 “....	86 “....	45 “....	131 “....	171 “
400	22.5 “....	49 “....	42.5 “....	91.5 “....	114 “
500	18 “....	33 “....	34 “....	72 “....	90 “
600	13 “....	30 “....	26.5 “....	56.5 “....	69.5 “
700	12 “....	23 “....	22.5 “....	45.5 “....	57.5 “
800	10 “....	19.5 “....	17 “....	36.5 “....	46 “
900	8 “....	15.5 “....	14.5 “....	30 “....	38 “
1000	5 “....	12.5 “....	10 “....	22.5 “....	27.5 “

c “Much enthusiasm and devotedness are required on the part of the troops for the general who commands, to induce an army to perform great actions in a war in which it takes no interest.

“The first qualification of a soldier is fortitude under fatigue and privation. Courage is only the second; hardship, poverty and want, are the best school for a soldier.”

Infantry against Cavalry.

	All yards....	All yards....	122 yards....	222 yards....	222 yards.
100	“ “	“ “	100 “	300 “	300 “
200	“ “	“ “	74 “	374 “	374 “
300	“ “	“ “	63 “	150 “	241 “
400	91 “	87 “	50 “	112 “	171 “
500	59 “	62 “	40.5 “	86 “	131 “
600	45 “	45.5 “	32 “	67 “	102 “
700	35 “	35 “	25 “	54 “	83 “
800	29 “	29 “	21 “	43 “	67 “
900	24 “	22 “	17 “	36 “	56 “
1000	20 “	19 “			

Team Shooting.—Discipline.

Undoubtedly the object of the system is to instruct the entire rank and file; and, theoretically, a team, however good, helps but little towards increasing the skill of the regiment it represents. Practically, however, it is otherwise. The competitions for places upon the team stir up an organization and bring out the shooting men. Many learn to shoot for the honor of being “on the team,” and others for the honor of their company or regiment. The practice brings together those interested in shooting, and helps to create a public sentiment in the subject, which helps the shooting of the entire regiment. A victory of a regimental team frequently has the happiest effect, and even a defeat excites regimental pride to try to do better. * * *

—Wingate.

Do not talk to any one, especially while loading your rifle. Attend entirely to your own work, never losing sight of the wind question, and as soon as possible cease to depend on

c "Well might Napoleon say that misery and want were the best school for a soldier; for as nothing could be compared with the total destitution of the army of the Alps, when he assumed the command, so nothing could equal the brilliant success which he obtained with this army in his first campaign in Italy."

the judgment of others. Keep diagrams of your shooting, registering angles, etc. Avoid troubling yourself with how other people are shooting, or what their scores are; you cannot alter them by wishing. Do not be constantly reckoning up your own scores, it is a waste of time and distracts the attention. In fact, be as careless as possible of what others are doing, and be as careful as possible of what you are yourself about.

To summarize—do your very utmost with each shot to succeed in hitting the bull's-eye, but do not compete; I mean, put aside the competition feeling. When shooting in a team make it a point of honor never to shoot against your own side, many a match has been lost by this having been done. If you are, while shooting a match, "chaffed," assume, if you are shooting well up, that the enemy is getting frightened; I find it often true; and when you have at last won a prize, do not be "nettled" at the man who leads you asserting he has got you the prize, for recollect that it comforts him in his distress, and may be partly true; and while I am on this point, be extremely cautious how you make use of the man who leads you, and, as a rule, do not attend to what he says so much as to what he does; he may be mistaken, though entirely anxious to serve you.

Finally, never believe you are safe until not only you have pulled off your last shot, but also found that everyone else has; and when you are beaten do not say you "don't care."

—*Sir Henry Halford.*

c “Valor belongs to the young soldier as well as to the veteran ; but in the former it is more evanescent. It is only by habits of service, and after several campaigns, that the soldier acquires that moral courage which makes him support the fatigues and privations of war without a murmur. Experience by this time has instructed him to supply his own wants. He is satisfied with what he can procure, because he knows that success is only to be obtained by fortitude and perseverance.”

Team Organization.

The system calls for government, and to that end a central power for arbitration should be vested in one man as captain, and a coach for each target, to be a receptacle for the information, to impart it to the next shooter, together with his further observations of the elements. None of them to be of the firing members. *Simply to be arbitrary is not discipline.* There must be respect and confidence, first between the shooters and their coach, and finally for the captain.

—*Perry's Observations on Rifle Shooting.*

There should be a spotter with a fine telescope for each target, whose accuracy is unerring, and a score keeper to dot the hits on each man's target, and to keep accurate record of his elevation and windage, both under the control of the coach.

Absolute silence should be the pleasure of the two members loading, and the captain, stationed between the two targets, should preserve it. All other persons should be excluded from a possibility of being seen or heard by the squad at the firing point.

If anything flagrant is being done, that is interfering with YOUR success, quietly call the attention of the official in charge, and allow him to take the responsibility of rectifying the matter.

Never yield a shot, if honestly in doubt, where *it can affect your score* so as to secure a *prize or requisite standing*. You are entitled to contest a shot not scored by the marker, and no

C "A well-organized system, good instruction, and severe discipline, aided by effective establishments, will always make good troops, independently of the cause for which they fight.

"At the same time a love of country, a spirit of enthusiasm, and a sense of national honor, will operate upon young soldiers with advantage."

honorable rifleman will find fault if you seek what *you believe to be right*. Be slow to contest shots while you are yet young in rifle practice. Beginners are always complaining of bad markers. ALWAYS TRY TO PUT YOUR BULLET WHERE THE MARKER CANNOT FAIL TO FIND IT.

—*Perry's Observations on Rifle Shooting.*

Preliminary Target Practice.

Attention is invited to the well-known and often repeated fact that more than average proficiency with the rifle is attainable without the expenditure of a single cartridge. This is accomplished simply by aiming at objects at different distances, and taking positions most suitable to the conformation of the individual. To become an expert rifleman one must acquire an almost intuitive perception of distances, and so perfect a sympathetic action between the eye and the trigger-finger, that they will act in unison without an effort. To this end, while a company is at target practice, those not firing or about to fire should be drilled at aiming or be allowed to aim at objects at different distances up to 500 and 1,000 yards. For this purpose a number of boards, the shape and size of men, should be put up at intervals of 100 yards, a little off from the range, and the men required to aim thereat standing and kneeling, the sight adjusted for the distance, till each notes how the same sized objects diminish as the distances increase. They should be required to snap the firing pin, or cap, if the rifle is a muzzle-loader, while steadily covering the object aimed at, till

c “Every means should be taken to attach the soldier to his colors. This is best accomplished by showing consideration and respect to the old soldier. His pay also should increase with his length of service. It is the height of injustice to give a veteran no greater advantages than a recruit.”

that sympathetic action between the eye and hand absolutely essential to good shooting is attained. Men who shoot badly must be especially instructed at short ranges, from 20 to 40 yards, and with diminished charges.

—*U. S. System of Target Practice.*

While the men should be instructed in their drill-room, yet when they are upon the range no pains should be spared to teach them as much as the time will allow.

The detachments should not, therefore, be larger than can be accommodated; and *while waiting their turn to shoot, the men should be practiced in aiming drill*, and with the indicator, care being taken not to tire their arms so as to prevent them shooting accurately when their turn comes. Their sights should be blacked and set at the correct elevation, and the proper allowance for wind told them before they go to the firing-point, and when there, a skillful shot should stand by to “coach” them and correct their errors.

The best shots of each company should be used for this purpose, under the direction of the company officers. Strict discipline should be kept; officers should remain with their companies; the men should be kept together and away from the firing-points, and, above all, kept at work. The squads should be sent from one target to another under charge of a non-commissioned officer, and no straggling, drinking, or boisterous conduct permitted.

—*Wingate*

The fundamental principle of rifle practice is that it is a matter of instruction to be taught in the drill-room; that the range is more to test what has been so taught than a place of

- c "The soldier who serves long, becomes attached to his regiment, as to a new family. He submits to the yoke of discipline, accustoms himself to the privations his situation imposes, and ends by finding his condition agreeable."

instruction. *Only experience will convince officers* that this is correct. The natural inclination of all is to obtain the largest possible allowance of ammunition, to spend as many days as possible on the range, and to neglect the steady systematic armory drill, which is necessary to properly instruct their men. In training a team, undoubtedly actual practice upon the range is necessary to enable men to acquire a knowledge of elevations and the allowance required to be made for wind; but even with them much more ammunition is usually expended than is necessary. In firing from the shoulder, constant practice in aiming drill will give the men almost as good a command over their weapons, and a union between the eye and the hand, as actual firing. * *

—Wingate.

Rifle Practice.

Not more than fifteen shots will be fired by any man, on any day, at any one distance, in the regular monthly target practice.

—Par. 11, G. O. 53, 1882.

A score will consist of not *less* than five consecutive shots, but must not be computed by selecting *any* five consecutive shots of the whole number fired at the same time and distance; they must be divided regularly, as the first five, second five, etc., etc.

—Par. 11, G. O. 53, 1882.

The target record kept at the firing point will be carefully attested and preserved, and open to inspection at all times.

c “There are few officers that have seen service, who have not discovered the difference between old and young soldiers, with reference to their power of supporting the fatigues of a long campaign, to the determined courage that characterizes their attack, or to the ease with which they rally after being broken.”

Firing at 100 and 200 yards will be standing, 300 and 400 yards kneeling, and 500 and 600 yards lying down.

—*G. O.* 43, 1881.

Any talking at the firing point, such as telling stories that superinduce laughter; discussions of an animated or quarrelsome character that call for serious reflection, and especially, that excites the prejudices, will certainly interfere with good shooting.

The mind should have but one object in view, viz., that collection of details which is necessary to make the next shot a bull's-eye. The introduction of *any* subject foreign to such details occupies the mind to the exclusion of some one of them.

Never quarrel. Never impose your excesses on others, whether resulting from good or bad luck.

—*Perry's Observations on Rifle Shooting.*

Practice will be conducted according to the authorized “Course of instruction in rifle firing.”

—*Par.* 485, *A. R.*

Neither the Regulations of the N. R. A., nor any modification thereof, can be used unless previously authorized in orders from Headquarters of the Army.

—*Letter Hdqrs. of the Army, A. G. O., July 25, 1883*

Firing practice by marksmen and first class men will be encouraged in all authorized positions, at both long and short ranges, and also under conditions where both rapidity and accuracy are involved, also firing as skirmishers.

—*G. O.* 5, *M. D. A.*, 1882.

“Montecuculli observes, that it takes time to discipline an army, more to inure it to war, and still more to constitute veterans. For this reason, he recommends that great consideration should be shown to the old soldiers, that they should be carefully provided for, and a large body of them kept always on foot.”

Means for gallery and short range practice with reduced powder charges, for use in inclement weather, will be provided by post commanders.

—*G. O. 5, M. D. A., 1882.*

The Quartermaster's Department will also provide the flour necessary for making paste for use in target practice.

—*G. O. 87, 1882.*

The suggestion as to allowing good marksmen to return to their quarters after having made the prescribed score is to be commended. Rifle shooting is so largely a matter of individual volition that commanding officers who are desirous of having their men good shots cannot be too careful not to make the practice disagreeable, and should do all they can to favor those who shoot well.

—*Wingate.*

Three kinds of practice should be specially practiced.

1. Skirmishing or firing at distances requiring to be suddenly estimated and without changing the sights.

2. Firing at small marks, representing heads behind a shelter trench.

3. Quick firing, which should be

(a) firing as many shots as possible in thirty seconds;

(b) firing at a target suddenly exposed.

(c) firing at a moving target.

The first practice is well known, and needs no explanation. The second is not generally practiced, and yet is of great importance. It is particularly needed at short distances; *i. e.* (150 to 50 yards), as all military rifles are sighted so high that to hit an eight-inch bull's-eye at one hundred yards, the aim

c "It is not enough to increase the pay of the soldier according to his period of service, but that it is highly essential to confer on him some mark of distinction that shall secure to him privileges calculated to encourage him to grow grey under arms, and above all, to do so with honor."

usually has to be taken on the lower center line. Yet if there is a time when the soldier should be able to hold "dead on," and hit exactly what he aims at, it is when he is crawling up to the enemy, endeavoring to put a bullet into a head or arm just appearing over a parapet or behind a stump or rock. Quick firing of all the kinds indicated is of almost equal value. It can be best carried on at a target similar to the "tramp" target used at Creedmoor—*i. e.*, a figure of a man pasted on a door attached to the marker's shelter, which is suddenly opened at a whistle from the firing point, and kept exposed for a specified period. This target is also valuable, as it teaches men that there is a great difference between aiming at a man and a black bull's-eye on a white target, requiring the blackening to be removed from thin sights, and a "snap shot" taken. Moving targets can be readily improvised, and their value needs no comment.

Practice at these targets, *by those who have learned to shoot*, will be found to be of great value. If properly treated, there is an element of sport in it which makes it interesting to the men, as well as a relief from the monotony of the regular target practice, and thus accomplish the object designed to be attained by the writer of the articles in question.

But these are not the targets upon which to learn to shoot in the first instance.

—Wingate.

An officer who takes considerable interest in target practice, thinks that where infantry and cavalry have had equal practice, the cavalry average better at all short ranges with the carbine, than the infantry with the musket. The only differ-

c "It is in the enterprize and courage resulting from an offer of battle that the preservation and safety of an army will most assuredly be found. In a retreat, besides the honor of the army, the loss is often equal to two battles. For this reason we should never despair, while brave men are to be found with their colors. It is by this means we obtain victory, and deserve to obtain it."

ence in the men is in the exercise they take. The length of the musket should give the infantry the advantage at all ranges.

Aiming low should be encouraged. The object is generally to drive the enemy's front lines. A bullet is effective even after striking the ground, and moving near the ground, if it misses the first line it may pick up a man in the second line; while a bullet traveling high is useless even if it hits a man in the reserves. Furthermore, it is a greater advantage to wound a man in the legs than to kill him by hitting him in the head or body.

—Wingate.

Marches and Fatiguing Work.

The men, when going through the class shooting, are not to be tired out by long marches to and from the range, or by fatiguing work beforehand. They are not, as a rule, to fire more than ten, or less than five shots, at one practice.

—*Ordnance Note, No. 111.*

Firer to Show Where He Has Hit the Target.

After firing, the man extracts the cartridge-case and comes down to the shoulder or short trail, calling out at the same time where he thinks he has hit the target, and then waits till the shot is signaled. In case the men find any difficulty in

c "It is an approved maxim in war never to do what the enemy wishes you to do, for this reason alone, that he desires it. A field of battle, therefore, which he has previously studied and reconnoitred, should be avoided, and double care should be taken where he has had time to fortify or intrench. One consequence deducible from this principle is, never to attack a position in front which you can gain by turning."

doing this, it is recommended that the officer or non-commissioned officer in charge of the party should have a plan of the target in use drawn out on paper, on which each soldier can point out the place where he believes his shot has struck. * * *

After firing, the weapon is to be kept at the present for a short pause, and then brought down in the man's own time, and the latter is then to state the point at which he was aiming at the moment of firing.

If a bad shot is made, the instructor is to point out, as far as possible, the reason of it. * * *

If the man is unsteady in aiming, he is to be ordered to come down from the present and rest for a few moments. If the unsteadiness continues, his practice may be deferred to a future day, or he may be put back to a shorter range by the special order of the company chief.

—*Ordnance Note*, No. 111.

Sighting Shots

In most matches a rifleman is allowed to take one or two preliminary shots, known as "sighting shots," which do not count on his score; and by carefully observing the effect of these, he can form a pretty good opinion of the conditions he has to contend against.

These can be fired in any position, and when the match is to be shot standing the first of these shots should always be shot

- c "There are five things the soldier should never be without—his firelock, his ammunition, his knapsack, his provisions, (for at least four days,) and his intrenching tool. The knapsack may be reduced to the smallest size possible, but the soldier should always have it with him."
-

lying, so as to get the elevation and force of the wind as exactly as possible. The second should be fired standing, to see how it affects the shooter.

—*Wingate.*

Sighting shots are not allowed.

—*Page 4, G. O. 53, 1882, and G. O. 5, M. D. A., 1882.*

While warming and sighting shots have been disallowed by the War Department in all competitions, they are not in ordinary target practice. For the first ten practicings one warming and one sighting shot should be allowed at all ranges over 400 yards.

Round-ball and Reduced Charge Practice.

The service cartridge shell, loaded with 7 grains of 1863 powder and round balls, calibre 44, weighing 140 grains, fired from the Springfield rifle at the range of 40 or 50 feet, yields astonishingly accurate results.

They will be found very useful, in lieu of indicator and candle practice, in instructing recruits; and at reduced targets will afford the trained marksman valuable home amusement and practice.

The bullets take the grooves perfectly, and at the ranges mentioned will just about pierce an inch board. New powder, in charges of 5 grains, would probably yield the same results.

For armory practice this has an advantage over air guns, or other guns of small calibre, because the soldier practices with his own rifle, *i. e.*, with a gun having the same weight, trigger

2 “It is fortunate that Napoleon has recognized the advantage of giving to every soldier an intrenching tool. This authority is the best answer to the ridicule which has been thrown upon those who proposed it. An axe will be found to inconvenience the foot soldier as little as the sword he wears at his side, and it will be infinitely more useful.”

pull, balance, and sights, that he will be called upon to fire in actual service.

* * * * *

Thus we have solved practically, and satisfactorily in many respects, the question of unlimited target practice.

For this practice the targets are to be reduced directly as the ranges. For instance, if a fifty-foot range be convenient, and it be desirable to obtain practice for 200, 100, and 50 yards; respectively, the following method may be pursued: 50 feet being one-twelfth of 200 yards, a reduction of target to one-twelfth its size represents a target for 200 yards; a reduction to one-sixth, a target for 100 yards; and to one-third, a target for 50 yards. The diameters of the corresponding bull's-eyes (Creedmoor third-class target) are two-thirds of an inch, one and one-third inches, and two and two-third inches, respectively.

At posts where there is no obsolete ammunition of 44 calibre, moulds for the spherical bullet of this size can readily be obtained from the nearest city by mail.

It is generally requisite to use with the bullet a lubricated patch in forcing it into the shell.

The shells will last indefinitely with this small charge.

—*Circular Mil. Dic. Pac. & Dept. Cal., September 29, 1879.*

With seven grains of ordnance powder the point blank of the round ball is fifty feet; with ten grains, seventy feet.

It will be found by nearly every rifleman that his practice at first with reduced charges will not be so good as at long range. This is probably due to a failure to hold steadily on

c "When axes are given out to companies, or are carried by fatigue men during a campaign, they are soon lost; and it often happens, when a camp is to be formed, that a difficulty arises in cutting wood, and building huts for the soldier; whereas, by making the axe a part of every man's appointments, he is obliged to have it always with him; and whether the object be to intrench himself in a village, or to erect huts in a camp, the commander of a corps will speedily see the advantage of this innovation."

the object after firing. With this small charge the ball travels with so low a velocity, it is an appreciable time in passing through the barrel, during which, without great steadiness, sufficient motion is at first apt to be given to the rifle to divert it. But it is this very fact—that the rifle must be kept on the object after pulling the trigger—which renders this kind of practice so valuable. The firer soon discovers this, when his practice at once improves.

The habit he acquires in this respect in short range aiming, he carries into long range practice with results as gratifying as they are astonishing. With seven grains of powder the report of the rifle is not so loud as the report of a percussion cap; the powder is nearly all consumed and condensed in the barrel, and consequently there is little smoke.

The rifle is much sooner fouled by using the reduced charge than the full charge. It should be wiped out after every fifth shot to secure the best results.

The source of interest in this kind of practice is that the firer sees instantly the point of impact of his ball, even while holding the rifle on the object, and can therefore readily see his error and remedy it. This, and the absence of recoil, causes improvement in the firing of beginners to commence at once. As the firer can be his own marker, individuals can practice alone during such odd minutes as may be at their disposal.

A "Creedmoor man" who has been practicing indoors with the Springfield rifle, with round bullets and reduced charges of

c "When once the axe has been generally adopted, we shall, perhaps, see the desirability of issuing pickaxes and shovels to particular companies, and also the benefit of more frequent intrenchments."

powder, with good results, makes the following report upon the subject:

"The first targets used were wooden, but the light charge used was not strong enough to penetrate the wood, and the bullets rebounded very unpleasantly.

"Finding a piece of 3-16 boiler iron, I covered the target butt with it, against which the balls flattened and fell to the ground without rebound or splash. The target was painted white, and the circles, reduced to correspond with the distance, were scratched thereon with carpenters' dividers. For the bull's eye the paint was scratched off. In practice the shot marks were painted out.

"The scores at first were poor, but after five or six days' practice I was able to make seventy-four points out of a possible seventy-five.

"Experiments were made with balls both patched and lubricated; results with the latter were best. The lubricant was tallow, melted and dropped from an oil can on the face of the ball in the shell. The tallow runs from the face around the sides, and cools almost immediately.

"While with long range practice, when the weather is unfavorable, there is little benefit, round ball practice under shelter can be constant, and affords amusement as well as the greatest possible good effect upon long range practice."

—*Report of a Lieutenant of First Cavalry.*

"By the use of the round ball with reduced charges in the service rifle, the recruit may more readily than otherwise be taught to hold his gun with steadiness, pull trigger without deranging his aim, and overcome a very natural tendency to shut his eyes and shrink from the recoil of his piece at the moment of its discharge; while the trained soldier may thereby

- c "It is more particularly during the retreats that it is important to intrench when the army has reached a good position; for an intrenched camp not only furnishes the means of rallying troops which are pursued, but if it be fortified in such a manner as to render the issue of an attack doubtful to the enemy, it will not only sustain the *morale* of the soldier in the retreat, but afford the general in chief opportunities for resuming the offensive, and profiting by the first false movement on the part of his adversary."

conveniently and economically preserve and improve that accord between the brain and the muscles, without which the best of marksmanship is impossible.

"In preparing reduced cartridges, to secure best results care is necessary, not only in proportioning the charge to the powder and range used, but in loading the same.

"The bullets should be *true*, and on this account the *moulded* are better than the *dropped*; they should fit *snugly* at the bottom of the service shell, otherwise a lubricated patch should always be employed.

"With *very* small charges it is well to have a stiff wad between powder and bullet. When the bullet is well home, the miss-fires are fewer, and the shooting is more accurate than when there is an air space between the powder and the bullet."

—*Report of a Captain of the Fourth Artillery.*

"There is less fouling of the gun barrel when the balls are slightly lubricated with Japan wax, paraffine, or some lubricant that solidifies in cooling, as distinguished from oils that remain liquid. * * *

"In firing 100 rounds with ball lubricated, the weight of fouling was 50 grains, without lubricant, 150 grains. When no lubricant is at hand wiping out the bore after every five or ten rounds, and then running a slightly oiled rag through it, will answer. The firing is more accurate when the shells and gun are cleaned after every five or ten rounds: the shells washed in warm water, and the bore of the gun wiped out by pushing a wet rag through it, and afterward an oiled one.

c “It will be recollected how Frederick, in the campaign of 1761, when surrounded by two Russian and Austrian armies, whose united force was quadruple his own, saved his army by intrenching himself in the camp of Buntzalvitz.”

“The endurance of the Frankford, Lowell, and Winchester shells is from 200 to 300 rounds fired with round balls and small charges. They give out by the bottoms of the pockets getting knocked in by repeated blows of firing-pin, which causes the primers to miss fire. * * *

“As the lead and tin of rifle bullets answer equally well with lead alone, rifle bullets recovered can be recast into round balls.

“My experience made here in 1879 indicated that with 10 grain charges and longer ranges than 100 feet, the pistol bullet with flat base gave more accurate shooting than round ball of equal diameter with equal charge.

“As the round ball is lighter than the pistol bullet of equal diameter, its initial velocity is greater with equal charges, and for distances not exceeding 100 feet, the loss of velocity in reaching the target is so small, that with the slugging of the ball in the rifling of the bore, it shoots very accurately. With an increase of range this accuracy would fall off, and the heavier conical bullet with larger charge would be required for good practice. * * *

“A slab of lead one foot square and one inch thick, has given better satisfaction for stopping the balls and saving the lead than any other method. At military posts the lead of the spent bullets can be obtained and cast into a slab.”

—*Lieut.-Col. James M. Whittmore, Ordnance Department.*

Interest in Rifle Practice.

As hunting will greatly improve the skill of the men in the use of firearms, it should be encouraged; and in addition to the cartridges which may be issued for that purpose under

c “The acknowledged advantage of bivouacing is another reason for adding an intrenching tool to the equipment of the soldier; for, with the assistance of the axe and shovel, he can hut himself without difficulty. I have seen huts erected with the branches of trees covered with turf, where the soldier was perfectly sheltered from the cold and wet, even in the worst season.”

Paragraph 1, General Orders No. 95, Adjutant General's Office, of 1877, cartridges will also be issued for that purpose under the following instructions: “On the frontier, where hunting for large game is practicable, the men will be encouraged to hunt; and captains of companies may sell cartridges to their men in limited quantities, according to the supply on hand, at the rate of two and one-half cents for carbine cartridges and three cents for musket cartridges.

—*Par. 4, G. O. No. 103 of 1874, and 70, of 1875, War Dept.*

Every commanding officer of a post will name an officer to supervise the target practice. This officer is not to take the place of the company commander in the instruction of his company in target practice, but is supplemental.

—*Par. 1, G. O. No. 95, War Department, 1877.*

Commissioned officers should practice with their commands.

—*Circular Mil. Div. Pac. & Dept. Cal., April 16, 1878.*

As a means of exciting interest in rifle practice and encouraging endeavors among men to become expert shots, the plan of dividing the company into “teams,” equalized according to proficiency with the rifle, and appointing over each a non-commissioned officer as captain, has been found to work well. * * *

To troops liable any day to be called into the field to oppose enemies, the most skillful in war, quick to find cover, that are well armed and most accurate shots at short range, there is no acquirement so important as that of fine marksmanship.

The military can secure an advantage over Indian enemies by becoming sure marksmen at ranges beyond 150 yards, for that is the extreme distance at which Indians use the rifle with

2 "The more obstinate the resistance of an army, the greater the chances of assistance or success.

"How many seeming impossibilities have been accomplished by men whose only resource was death!"

accuracy, for it is the extreme distance at which they have any occasion or can afford to use it.

Every effort should, therefore, be made by post and company commanders to develop in their commands such an interest in the use of the rifle, and give such proper instruction that the worst shot will soon be able to score at least 72 per cent. at 200 yards, and 60 per cent. at 300, 400, and 500 yards, "off-hand."

On cold or windy days target practice should be dispensed with. On fine days practice and instruction should be prolonged so as to permit each man to fire from 15 to 30 shots, with intervals of rest between each five shots. Opportunity will thus be afforded good shots to become confirmed in their practice, bad shots to detect and correct their errors before the recollection of them passes away.

During the finest weather of the year, especially if it occurs early in the spring, before Indian hostilities usually break out, all that remains of the annual supply of ammunition for the target should be expended in careful practice during a few weeks, stimulating interest and pushing progress to the utmost.

To men who once become good marksmen a few shots bring back all their skill.

If company officers will practice frequently with each other and occasionally with their companies, they will have adopted the surest method of developing in their commands a lasting interest in the duty of becoming good marksmen; a duty which in garrison should be a pleasure, and which in its results cannot fail to beget in men a fearless independence when thrown upon their own resources—when separated from their commands on the scout or on the skirmish line.

—Circular Letter, Mil. Div. Pac. and Dept. Cal., Jan. 28, '79.

c "To withdraw from danger, and thereby to involve their comrades in greater peril, is the height of cowardice. Such conduct should be proscribed, declared infamous, and made punishable with death."

At the Presidio range there are sixteen targets, yet at the only time of day at which all men can best practice—the first hour of fatigue call—it requires twelve of these targets for one and a half hours to enable the three companies to get through their practice.

To interest men in this duty and bring out their best efforts, it must be not only the first undertaking of the day, when their nerves are in the best condition, but it should be quickly over, and should be executed in the presence of as many of the company as can be kept on the range.

If every post in the service can have a range with targets at least in the proportion of four to a battery, six to a company and a troop, and situated between north and west of the firing points, so that the firing must be conducted in the morning and may be carried on at three different ranges at the same time, and the duty for the day be over without dragging along, there will be many marksmen in every company.

Such is the case at the Presidio and Fort Point, and such is the result.

A range for a battery, consisting of two mantlets 16×7 feet, thirty feet apart, and four butts* for targets 8×8 feet, all one and a half feet wide at base and eight inches at top, of two inch pine plank, will require 2,250 feet, which, with the necessary scantling, 447 feet, and 180 feet scantling for frames and track for the truck, will cost from \$80 to \$110.

Surely it is not too much to expect that the funds in the hands of the Department Chief Quartermasters can, under General Orders No. 87, current series, Adjutant General's

* Butts in rear of targets are of the greatest importance, not only on account of the protection they afford to persons and animals that may approach the range unobserved, but to secure the lead, which can be sold at from four to ten cents per pound, and thus provide a fund out of which to offer prizes and target medals.

c “Retreats cost always more men and *material* than the most bloody engagements; with this difference, that in a battle the enemy's loss is nearly equal to your own, whereas in a retreat the loss is on your own side only.”

Office, meet such a small demand as this from each company in the Division.

The manner of instructing recruits and inveterately bad shots has become well established, but still is not generally known or practiced.

An old soldier who cannot, after years of trial, hit a target with the service charge at 100 yards one shot out of four, can be made a good shot at 200 yards in twelve lessons, of ten shots each, with reduced charges; and a qualified marksman in eighteen lessons,—

3 lessons with 7 to 10 grains, round ball, at 30 to 70 feet:

3 lessons with 30 grains, service bullet, at 35 to 50 yards;

3 lessons with 40 grains, service bullet, at 50 to 100 yards;

3 lessons with 55 grains, service bullet, at 100 to 200 yards,*—

whereas with the service charge alone such men never become good shots. This has been demonstrated at this post frequently.

When a man once becomes an assured shot he will remain one as long as his health and habits are good, and often long after his habits are bad.

The truck support for targets,† a device of Captain Cushing, 4th Artillery, and in use at the Presidio range for nearly a year, gives entire satisfaction, and it is indestructible and can

* In connection with the first lessons, the instructor must, of course, see that the soldier's off-hand position is correct—one at least best adapted to his conformation; that he presses the trigger without a jerk, and keeps his eye open and steadily fixed on the object.

If, withall, the man's shooting is unaccountably bad, there is probably some defect in his eyes, which it will be the duty of the Post Surgeon to ascertain.

As the method of rifle instruction is, and should be, left to company commanders, it will necessarily differ in detail. If, however, these officers practice with their companies, they will have no difficulty in determining which general method is best, and will soon see that no one system will equally benefit all their men; but that to achieve the best results it must be varied to suit individual dispositions.

† Now supplied by the Ordnance Department.

c “There is but one honorable mode of becoming prisoner of war. That is, by being taken separately; by which is meant, by being cut off entirely, and when we can no longer make use of our arms. In this case there can be no conditions, for honor can impose none. We yield to an irresistible necessity.

“There is always time enough to surrender prisoner of war. This should be deferred, therefore, until the last extremity.”

be used to support any target. The truck, 6 × 4 feet, of three-inch scantling, is mounted on wheels six inches in diameter, and moves on a railway which extends behind all the mantlets the whole length of the range. It is protected, where exposed between the mantlets, by a low bank of earth, rivetted. A single truck is used for the *A* and *B* targets. Two are fastened together when the *C* target is used.

To afford a moving target, the truck is drawn back and forth between mantlets by the markers. The movement can be varied, and such speed given as to test the ability of the best marksmen, and be so moderated as to accommodate the less expert.

—*Letter Hdqrs. Mil. Div. Pacific, October 9, 1882.*

The Department Commander, while appreciating the increase in efficiency over last year, remarks upon the lack of interest shown in many troops and companies. He wishes to impress upon the *officers*, that they are expected to take the lead in infusing enthusiasm and interest in shooting; the enlisted men will follow them.

—*G. O. Hdqrs. Dept. of Texas, November 22, 1882.*

Where every officer makes a point of carrying out fully and faithfully the orders and instructions from superior authority, takes a personal interest in the development of the system, practices habitually with the enlisted men, thereby exciting and maintaining zeal and emulation, and becomes, through determination to excel, practically and theoretically proficient in the use of the rifle, certain and rapid improvement is assured.

—*G. O. Hdqrs. Dept. of the East, December 30, 1882.*

d *Important Observations of Modern Commanders and Military Critics.*

“Whenever it is possible, have music to march to. If the band is broken up, the drums and bugles should play together. Nothing is more martial in sound, and the men march a hundred per cent. better to it than in silence.”

It is observed that in some companies there are still found men who exhibit little or no progress, and in some cases actually falling off from the standard of shooting previously attained.

It is even worse than a waste of time and ammunition to keep such men firing with their companies, and they should, at the discretion of the officer commanding, be exercised thoroughly after their tours as lookouts and markers, in aiming and position drill, and in individual firing with reduced powder charges and, with the aid of a rest or other substitute for the aiming stand, at such short distances as may be deemed desirable.

Habits fatal to good shooting, such as involuntarily flinching at the moment of firing, too quick or violent pulling of the trigger, and defective manner in holding and sighting the rifle, are most readily corrected by these means, and it will be found of great benefit to all to frequently practice at very short distances, with small powder charges and at small objects.

—*Circular Hdqrs. Dept. of the East, June 15, 1883.*

* * * For the first year the number of long-range shots and their skill have become noticeable, while at ranges up to 600 yards the marksmanship is remarkable. There is a general wish among company commanders that skill at the long ranges should now receive similar recognition to that extended to marksmanship up to 600 yards—that is, that men who make scores, say of 70 per cent. at 700 and 800 yards, be properly designated and be authorized to wear a “button” sufficiently dissimilar from that now issued to indicate

d "The running drill has been a glorious innovation. What really fatigues and disgusts soldiers is the time that is dawdled away in parades."

skill at those ranges; also, that they receive similar recognition for special skill at the 900 and 1,000 yards' ranges.

There is a growing desire among captains for a rifle that will give better results at ranges over 600 yards than the service rifle. The skill of men who are marksmen is no longer seconded by their rifle. They have got beyond its capabilities.

They claim that the attention they give to reloading their ammunition, to making allowance for wind deflection, to aiming, holding, etc., should enable them to get better results than they do.

Marksmen now desire that the six-grooved marksman rifle be issued to them, as this gives the projectile a flatter trajectory and less deviation than the three-grooved service rifle. In many companies there are a few marksmen's rifles for long-range practice. But this is not satisfactory, for the men who once use this better rifle take little interest afterwards in the service rifle. The adoption of this suggestion will not only be a great inducement to first-class men to become marksmen, but will afford the marksmen the opportunity to become good shots at long ranges.

If this be done, six-grooved carbines should also be issued to the cavalry marksmen.

The problem of rifle practice up to 600 yards has been nearly worked out in one department, where out of an aggregate of 906, there are 304 marksmen, and 155 first class men; where in one regiment, the aggregate of which is 331, there are 186 marksmen. To possess a rifle with which to attain some higher skill is now the general wish of all good shots.

—*Extract from Report of Asst. Adjt. Gen., Dept. Cal.*

The names of commissioned officers present at target practice will be given in the place provided on the report

d “The powers of a weak man, endowed with hope and lofty courage, are always of greater service to the State than those of a great strong fellow who is discontented and desponding.”

All soldiers, except hospital stewards, ordnance and commissary sergeants, are required to attend target practice at least once every week, unless prevented by sickness.

—*Model Report of Target Practice, Mil. Div. Pac. & Dept. Cal.*

The greatest benefit in developing good shots and building up an interest in rifle practice, will be found to result from badges offered for competition monthly, not to become the property of the winner until won a certain number of times. The longer the struggle for these badges continues the more their possession is valued.

—*Wingate.*

No advantage is gained by firing more than ten shots at a distance; and the habit beginners have of expending all the ammunition they can procure as fast as possible is a positive detriment. Each shot should be fired with a definite purpose, and its results noted and remembered. The captain of each squad, or of a team, should give special attention to this subject, as not only will the expense of the practice be greatly reduced, but the quality of the shooting greatly improved. There is nothing which prevents wild and hap-hazard shooting and develops those qualities of coolness, forethought and judgment, which make a reliable shot, than to be kept on a short allowance of ammunition.

—*Wingate.*

Several company commanders in the department have presented medals for competition in their companies; as this stimulates the ambition of the soldier, and his desire to excel in marksmanship, and therefore promotes the general proficiency of the company, it is an excellent measure. Its good effects are,

d "A great object with officers should be to keep those committed to their charge in good health. Without it, nothing can be accomplished. There are precautions to be taken, and rules to be attended to—the result of experience—which it is now disgraceful in an officer to be ignorant of."

however, largely neutralized by the decision of the War Department, published in Circular No. 5, of June 22, 1883, prohibiting the wearing of these medals on occasions of ceremony. and I would recommend that this decision be modified accordingly.

—*G. O. No. 27, Headqrs. Dept. of Dakota, Nov. 15, 1883.*

Target Practice not to last too long.

Target practice should not last more than one hour; those having duties requiring them elsewhere (cooks, bakers, etc.), should fire first and then be dismissed. The difficulty about this, however, is removed by having a target and butt for each eight or ten men. The dimensions and form of the butt are given in Circular of August 15, 1878. The target should be arranged so that it will slide back behind the butt while the marker is covering the bullet holes.

—*Circular Mil. Div. Pac. & Dept. Cal., September 9, 1879.*

Effect of Physical Training.

The prize winners this year are known throughout their regiments as men of irreproachable character, remarkable for their strength, activity, and endurance, and that amiability and self-possession which is always the result of correct physical training. Marksmen, therefore, cannot too soon devote attention to athletic and gymnastic exercises in preparing for these

d "It is difficult to wash clothes during a campaign, but it can really be dispensed with for a long time without injury to health: linen or cotton shirts should not be used in the field; two good flannel shirts of a greyish color are ample for all ranks, if worn day about; when the shirt is taken off, it should be hung up, stretched out, and exposed to the sun and wind. It should be shaken and beaten with a small stick, or well brushed. The same rule applies to trousers or drawers, when such are worn. Washing soon ruins flannel and all woollen materials."

rifle contests, in which the War Department shows the utmost interest, and which may soon be expected, more rapidly than heretofore, to increase the efficiency of the Army, and thus excite the admiration of the Government and the Nation, and secure to the military service the generous support of Congress.

The need of, and desire for, recreation and amusement rooms at all large posts is very generally expressed. It is believed that no outlay of the Government will produce so much soldierly efficiency and contentment; that in well-appointed buildings in which the military may freely exercise without constraint, and receive instructions in training for all manly contests, will be found a means of abating many of the evils which beset military life.

Till this is fully provided for by the War Department, company commanders can, under the provisions of Paragraph 552, at a very small cost, by the labor of their men, prepare simple, well-known appliances for physical culture, to be used in some sheltered place in the open air, if there be no vacant room.

The exercise, which combines to some extent much that is excellent in the appliances of the gymnasium, is the manual of the bayonet. "It not only develops strength and activity, but cultivates the character and gives dignity to the bearing of the men. It gives no occasion for rudeness, calls for no over exertion, yet brings into active play every muscle of the body and demands unremitting attention." Its effect is to discipline without producing constraint, and while men are enduring the fatigue necessary to become skillful in handling

d "The mind and the body must both be attended to: each reacts upon the other. If the man is not well fed, well clothed and housed, the privations must soon tell upon his disposition and his temper. The result can only be sickness and uselessness. See that your officers and men have something to eat and drink before they begin their work, no matter how early. A cup of hot coffee and a biscuit is a good morning meal before the regular breakfast."

their rifle in a way that they may never be called upon to in war, they are, nevertheless, acquiring an ease and dexterity in its use of the utmost importance in steady and rapid firing.

It is a significant fact that the company in this Division which has this year made the best average per cent. (87.42) in competition for the Nevada trophy is the one reported by the Assistant Inspector General as by far the best instructed in the bayonet exercise.

—*Circular Hdqrs. Mil. Div. Pacific, November 13, 1882.*

Some years ago an Army officer who visited the pistol gallery of ———, the celebrated pistol shot, asked him to shoot, and was told that he was then out of "condition," and could shoot no better than any one else. Before he shot a match, or for exhibition, he went, it appears, through a course of exercise similar to that taken by a prize-fighter. He walked and ran a certain number of miles, exercised with the clubs, was bathed and rubbed down daily, and ate and drank according to rule, tobacco, coffee, and everything stronger than beer, being forbidden. This regimen was followed for six or seven weeks, and pistol practice was added only during the last few weeks. After the match was over, ——— stopped his exercise, and soon fell off in his shooting.

If neglect of or attention to exercise, diet, etc., can change an ordinary shot into a remarkable one, or the reverse, it would seem that the question of the relation between good shooting and the development of proper physical conditions is one worthy of more consideration than it ordinarily receives. Indeed, one of the arguments in favor of rifle practice among

d "Get your men hot meals when possible. If preserved or cooked rations have been served out, and there is time, they should be warmed or made into soup or bouilli before being eaten. This is of great consequence after a long march, or a day of hard fighting. Save your men when you can; they will be all the more fit for a great effort when you require them to make it."

the State troops has been, that its natural tendency, so far as it went, was to promote habits of temperance and frugality. In the Army, necessary duties would probably interfere with a regular course of exercise, but more attention might be paid to this. At the ordinary company target practice, the officers smoke and the men chew. As tobacco affects the nerves, and thus interferes with good shooting, the use of it just before practice should be stopped. Observations will show that scores made directly after pay day are apt to be poor.

—Wingate.

Commutation of Rations

To be allowed to soldiers selected to contest for places or prizes in Department, Division, and Army teams, while traveling to and from the place of contest, and during their stay thereat.

—G. O. No. 41, A. G. O., 1883.

The provisions of General Orders, No. 41, current series, from this office, do not apply to enlisted men competing for places on department rifle teams when the competition is held at the post where they are stationed. The men of the garrison while so engaged should not be reported as "on detached service."

Creating Interest in Rifle Practice.

COMPETITIONS, MATCHES, AND PRIZES.

There are three grades for competition and army prizes—

1st. The Department.

d “The men’s stomachs being attended to, their feet come next, and are of equal importance; good shoes and woollen socks are indispensable, the latter to be washed whenever there is a halt.”

2d. The Division.

3d. The Army.

—*Par. 2, G. O. 53, 1882.*

1st. The Department, *Annual*, for which the department commander will cause the selection of the most suitable “marksman of each company, battery, or troop, and one from each non-commissioned staff or band, and assemble them in August to compete for places on the department team, at the marksmen’s ranges, during three days, after the necessary preliminary practice. On each of these days, each competitor will fire one complete score of seven shots, at each of the prescribed ranges, and a report thereof will be transmitted to the division commander. The twelve marksmen making the highest aggregate scores will constitute the department team; to the marksman making the best aggregate score will be awarded a gold medal. Two alternates can be added to the team at the discretion of the department commander.

—*Par. 3, G. O. 53, 1882.*

In a Department match the competition must be between marksmen qualifying within *each target year*.

—*Letter to C. G. Dept. Col., Oct. 3, '83—3958 A. G. O., '83.*

2d. The Division, *Annual*, for which division commanders will assemble the department teams to compete in September for places on the division team of twelve, and for the division prizes, in which competition the firing will be *individual*, by the collective members of all the department teams.

The first, second, third, and fourth prizes will be a suitably inscribed gold medal and the remaining eight, silver medals.

—*Par. 4, G. O. 53, 1882.*

d "The physical condition of the men and horses is of the most vital importance. Both must be well fed during the march, for the wear and tear upon the system is much greater than when halted; an extra allowance of meat and tea should always be given."

2d. The Army: *every alternate year* beginning in 1882, for which the General of the Army will assemble from the entire army twelve of the best shots, to compete for the army prizes, as follows:

1st prize, a gold medal, suitably inscribed; the next two, gold medals, and the next three, silver medals.

—*Par. 5, G. O. 53, 1882.*

All prizes become absolute property of the winners and may be worn on dress occasions.

—*Par. 5, G. O. 53, 1882.*

Medals will be prepared by the Ordnance Department and the expense paid out of the contingent fund of the army.

—*Par. 5, G. O. 53, 1882.*

In assembling the competitors no ordinary exigency of the service, field, or other duty, will be allowed to interfere with the representation of every company having a qualified marksman.

—*Par. 3, G. O. 53, 1882.*

Commanding officers will forward to the place of competition the descriptive lists of enlisted men and the qualifying scores, with dates, of *all* marksmen selected for the competitions.

—*Par. 3, G. O. 53, 1882.*

The selection of men from companies for (competition for) position on the department team is determined by the record of regular target practice.

—*Decision Sec. of War, Cir. Mil. Div. Missouri, July 16, 1883.*

d "Practice your men in marching. The army that can march best, is the best army, and the regiment that can march best in an army, is the best in that army."

Skirmish matches between organized teams may be conducted at the annual contests, under orders of department and division commanders; also at the conclusion of division contests division teams may, under orders of division commanders, compete against each other as organized units.

Division commanders may also arrange matches over longer ranges, in which the use of the marksman's and the long-range rifle may be permitted, for which the Ordnance Department will issue necessary arms and ammunition.

—*Par. 10, G. O. 53, 1882.*

For rules and penalties as prescribed for department and division contests see *G. O. 53, 1882*, and page 204, Appendix, Laidley.

Make the competition one of five instead of three days, seven shots to be fired at each range, each day. Award one gold, three silver, and eight bronze medals to the members of the department team, instead of a single gold medal, as is now done. If considered necessary, the value of the present gold medal might be sufficiently reduced to cover the cost of the other medals. Consider the commissioned and non-commissioned staff of a regiment a single organization, and select the most suitable marksman to represent them in the competition. Permit one commissioned officer from each staff corps, and also one non-commissioned officer from each staff corps to compete, these representatives to be selected by the department commander. Permit each department commander to select the time for the competition in his own department, the only restriction imposed being the necessity of having the team chosen in time for the division competition.

—*G. O. No. 27, Headqrs. Dept. of Dakota, Nov. 15, 1883.*

d "In the days of the machine soldier, when armies fought within a few hundred feet of each other—when 200 yards placed cavalry out of reach of the infantry missile, the question of distances, intervals, and alignments of troops were most important and the tactics which provided carefully therefor are still extant."

Nevada Trophy.

The "Nevada Trophy" is offered for competition to all companies and batteries in the regular army. The firing will be with the service arm and ammunition, and according to rules laid down in Laidley's Rifle Firing, revised edition, supplemented by such as may be issued in General Orders, Headquarters of the Army.

—G. O. 45, 1881.

For the purpose of ascertaining to what troop, company, or battery, the prize shall be awarded, each department commander will, during October of each year, cause the monthly records of best target firing (Form 30-c) of each company in his command to be critically examined, and that company having the highest scores at 200 yards standing, 300 yards kneeling, with the target ("A") prescribed for these ranges, for any of the twelve preceding months, provided that the firing by said company has been by not less than 80 per cent. of its average aggregate strength for that month, will be reported to the Adjutant General, who will decide therefrom what company is entitled to the championship. This report will be made on Form 30-c, and must show in detail the scores made at the prescribed ranges, and also the average aggregate strength of the company for the month and the percentage firing.

—G. O. 52, 1882.

The "average aggregate strength" should not include men permanently detached.

—Letter Hdqrs. of the Army, A G O., July 25, 1883.

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d "But all this apprehension about the enemy penetrating intervals between brigades and regiments; all this need of having the present one rank formation aligned and closed in shoulder to shoulder as scrupulously as the two, when the rear rank were required to fire between the front rank files, has passed away with the introduction of accurate long-range firing."

The score will be certified by a commissioned officer in the following form:

"I certify that the above scores and percentages were made in regular practice, without shed or shelter of any kind from wind or weather, and in strict accordance with the rules and orders in force governing competitive rifle firing."

—*G. O. 52, 1882.*

Ten consecutive shots, or two consecutive scores of five shots each, at each of the above ranges, will be taken as representing the best scores of each man firing.

—*G. O. 52, 1882.*

On monthly reports of target firing (Form 30-d) for that company holding the trophy, will be noted "Nevada Trophy held by this company." The signature of the officer making these reports will be understood as a guaranty that the trophy is in his possession.

—*G. O. 45, 1881.*

The commanding officer of the champion company or battery will be the custodian of the trophy. The commanding officer of the company or battery winning it will receipt to the officer from whose custody it is transferred to him.

—*G. O. 45, 1881.*

All reports of competitions by companies for the "Nevada Trophy" will be rendered on Form 30-c, "Record of best firing," and will be plainly endorsed: "Competition for Nevada Trophy."

—*G. O. 5, M. D. A., 1882.*

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d "But notwithstanding our tactics still enjoin the same care in dressing and closing in after every maneuver as formerly, although the matter now is not only of no importance, but a positive detriment to that individuality of action from which the best results in modern warfare are to be expected."

Possessorship of the trophy will be noted on the Army Register opposite the letter of the company holding it.

—G. O. 45, 1881.

Volley Firing.

Volley-firing is an important part of rifle practice, more so than is generally appreciated. The rapidity with which modern breech-loaders can be discharged requires that great attention should be paid to "fire-discipline," and the keeping of the fire of troops under rigid control.

After men have been instructed as individuals, experience shows that if the commands are properly given men will shoot as well, and sometimes better, by volley, than when firing singly, and almost always better than in file firing, where they are disturbed by the movements of their comrades. In several papers read before the United Service Institution of Great Britain, upon the Turco-Russian War, it is stated that all European authorities concede that in future infantry fire will be employed by volleys, and at the extreme ranges (one thousand to fifteen hundred yards), and that for this purpose careful practice is necessary.

—Wingate.

478. It is then a matter of the first importance that the intervals between the commands *aim* and *fire*, as given by the officer, should be always the same, that the soldier may know how much time he will have to devote to aiming, and how quickly he must catch his aim. This interval should be just that required by the majority of men to take aim without un-

d "In the field now, with troops in single rank, armed with a weapon which annihilates distances, why should there be an effort to dress and close in files? There is no advantage gained thereby, but there is valuable time lost in finding cover and opening fire, and in diverting men's attention from the enemy, and needlessly exposing them."

necessary haste, and no more; those men who are usually slower and consume more time, will soon learn how much they must quicken their motions, and do so accordingly.

—*Laidley.*

It is an advantage to practice several rounds of simulated firing before loading. If the officer, after the word aim, will count, in a distinct voice—one, two, three—with a second's interval before the command FIRE, the men will be greatly aided in taking sight by knowing just how much time they have. If upon inquiry the majority of the command claim they had not sufficient time, then four, five, or even six seconds, should be counted before the command fire be given.

Classification.

The annual classification will be made October 1, from monthly records of best target firing, and officers and men are to be classed as follows:

Marksmen: All who have 80 per cent. at 200 yards standing, 300 yards kneeling, and 70 per cent. at 600 yards lying down.

1st Classmen: All who have made 65 per cent. at 200, 300, and 500 yards.

2d Classmen: All who have made over 50 per cent. at 200, 300, and 500 yards.

3d Classmen: All others.

—*G. O. 86, 1879; G. O. 43, 1881, and par. 522, Laidley.*

d "If there is no advantage in this careful alignment and close array in battle there can be none on the drill ground. It only occupies time and harrasses men. The minutes spent in this idle performance at drill could be better occupied in executing the next maneuver. The fact is companies and regiments should be so drilled that neither distances nor alignments are lost in any movement. If they are, let them exist at the halt, as a reproach to the officers and file closers for not doing their duty, and let the next movement proceed."

At posts where no range greater than 300 yards can be procured, all men making marksman's scores at 200 yards standing, 300 yards kneeling, and 80 per cent. at 300 yards lying (on target A), will be included in the 1st class. In like manner those making 1st class percentages at 200 and 300 yards will be included in the 2d class.

—G. O. 25, 1883.

Members of the company present at any time during the target practice season, but who have not practiced, constitute a separate class, to be known as "present, but not firing." X

—G. O. 25, 1883.

Any two scores of five consecutive shots each at the same range during the [target] year may be taken for determining the percentage at *that* range.

—G. O. 43, 1881.

[*Inferentially*: A score made at any range may be used as one of the two scores necessary to qualify, at that range, in any class, and again used as one of the two scores necessary to qualify at that range for a higher grade.]

Practice will commence at 100 yards or less, and advance with proficiency, 100 yards at a time.

—Pars. 5 and 490, *Laidley*.

[*Inferentially*: Qualification in the 1st and 2d classes should precede practice for a marksman, but 80 per cent. made at preliminary practice at 200 and 300 yards would justify direct advancement to 600 yards.]

d "Tactics should be for purely practical, not ornamental effects. The movements they enjoin are for special use in the greatest crisis of national affairs and should therefore inculcate only the simplest means for the attainment of their end,—for no complicated movement can under dire circumstances succeed."

A marksman of one target year must qualify as such in any succeeding year to remain in that class.

—*Decision, General of the Army.*

Referring to the communication from Major G. V. Henry, 3d [9th] Cavalry, forwarded by endorsement of August 20th, 1883, from your Headquarters, I have the honor, by direction of the General of the Army, to inform you that a soldier honorably discharged from service in one company (by expiration of term of enlistment) and re-enlisting in another company, should not be deprived of the rights acquired by qualifying as a marksman in his former company. He takes the same position as a marksman in the new company he had in the old, for that year's target practice.

—*Circular Hdqrs. of the Army, September 21, 1883.*

Upon the question as to whether a marksman must have qualified in the current target year to entitle him to represent his company in the Department match, the General of the Army states that the competition must be between marksmen qualifying within each target year.

—*Letter A. G. O., October 3, 1883.*

By decision from the General of the Army, dated August 17, 1882, "the General Service clerks and messengers can compete for a place in Department and Division team. One place only will be allowed the Department Headquarters."

The General of the Army directs that when a man is transferred from one company to another his descriptive list must be accompanied by a statement giving his best scores during that target year; and that the company to which the man is transferred receive whatever credit results from the transfer.

—*G. O. 9, M. D. M., 1883.*

d “The need of a more accurate fire discipline, and of a free and long step being absolute, there is no longer a two rank organization in battle or on the march; yet our tactics require the soldier to drill with the little finger on the seam of his trousers, thus hampering his movements and stride. The small men, who regulate the step of an army, are thus limited to a stride of twenty-eight inches.”

General Orders No. 25, Headquarters of the Army, series of 1883, require that “all officers and men who, at any time during the target year, have been borne on the rolls of the company, will be entered on the annual report and considered in making the classifications.”

Short-sighted Men and Poor Shots.

If, during the course, it is discovered that certain men are short-sighted, their instruction may be limited to those ranges at which their sight permits them to shoot with effect. If it appears, in the course of ball practice, that certain men are not likely to improve in their shooting, and that therefore a continued expenditure of ammunition by them would be wasted, they may be, at the discretion of the battalion commander, excluded from taking any further part in the course.

—*Ordnance Note, No. 111.*

Marksman's Buttons.

Marksman's buttons will be issued in pairs.

—*Par. 7, G. O. 53, 1882.*

It is optional with an officer to wear the buttons, if a marksman.

—*Cir. Sept. 15, Dept. of the East, 1881; Decision, General of the Army.*

d “While it is true the men of small stature must regulate the step of the army, there should be some compromise in the matter. It certainly cannot be expected that all men above five feet four inches should shorten their natural step to that which the short man is compelled to take when he holds his arms stiff to his side. The step prescribed for such men should be that which they can take by making some effort, aided by swinging the arms.”

As the button indicates the wearer as a marksman, he will only wear it when he is borne on the roll as such, and not when he ceases to be a marksman.

—*Cir. No. 6, A. G. O.*, 1883.

But one set of buttons will be issued to each marksman.

—*Cir. No. 7, A. G. O.*, 1883.

Marksman's buttons become the property of the marksman.

—*G. O. 44*, 1881.

But one set of marksman's buttons will be issued to, or worn at any one time by, any officer or soldier qualified and announced as a marksman; if necessary to replace them on account of loss, etc., another set may be issued to the marksman. Any man qualified and announced as a marksman will be so considered during the succeeding target year, and until he fails to qualify as a marksman.

—*Cir. 9, A. G. O.*, 1883.

If the buttons are to be continued as the marksman's badge I am not prepared to recommend any method better than the one laid down in these decisions of the War Department—the disadvantages attending this method, however, seem to me the strongest argument for the substitution of a badge for the buttons now issued. I had the honor last year to suggest a badge for this purpose, and now renew that recommendation. This pin, and a single bar, made of bronze, should be awarded the soldier the first year he qualifies, and an additional bar each succeeding year. When he has qualified for five years the pin and bars should be replaced by one giving the five years he

d "Upton says tacticians adopt the method of instructing men to march with stiff arms as necessary to discipline. But is not this view of securing discipline only in accordance with those which obtained in the days of the leather stock and corporeal punishments, and numerous other odious devices of the martinet."

has qualified for, to which an additional bar should be added for each additional period of five years. Some such method as this would show in how many years, and what years a soldier had qualified as a marksman, and as the absence of bars for later years would show that the soldier's expert shooting days were over, there would be no necessity of depriving him in the latter years of his service of badges won when a younger man. If the suggested class of "sharpshooters" should be adopted, a similar badge substituting "sharpshooter" for "marksman," and of a different metal, might be awarded men who qualified for that class.

—G. O. No. 27, *Headqrs. Dept. of Dakota*, Nov. 15, 1883.

Figure of Merit.

Recruits joining during the last month of the target year and all members of the company who have been absent from the station for the entire practice season, will not be classified or considered in computing the figure of merit.

—G. O. 25, 1883.

The figure of merit will be computed as follows: Multiply the number of marksmen by 100; the number of 1st class men by 60; the number of 2d class men by 30; the number of 3d class men by 10; the number "present but not firing" by 0; divide the sum of the products thus obtained by the total number in the above five classes—the result will be the figure of merit.

—G. O. 25, 1883.

d "To discipline men they should be restrained from doing what is detrimental to their physical condition, and instructed in doing what is needful and right therefor; and as it is all important for men, when walking, to swing their arms, the soldier should be required to do this, not only for his comfort and health, but to aid his stride."

The figure of merit of a regiment, post, or department, will be computed in a similar manner.

—G. O. 25, 1883.

Reports.

Monthly reports of all firings at targets will be made by company commanders to department, through regimental, headquarters, and an annual consolidated report will be made by department commanders, October 1st of each year, to the General of the Army.

—G. O. 86, 1879.

In all reports and records it will be understood that firing at 100 and 200 yards will be standing, at 300 and 400 yards kneeling, and at 500 and 600 yards lying down.

—G. O. 43, 1881.

When no firing takes place during the month a letter of explanation will be forwarded in place of the required reports.

—G. O. 43, 1881.

X The "average aggregate strength" of the company for target firing should not include the men "permanently detached."

—*Letter Hdqrs. of the Army, A. G. O., July 25, 1883.*

When companies are serving at stations remote from regimental headquarters the commanders will send monthly reports of target practice direct to department headquarters.

—G. O. 1, 1880.

d "If officers and men are not taught, as cadets and recruits, the quick, long step, which comes from swinging the arms and the motion of the shoulders, they will not acquire it afterwards."

All officers and men who at *any time* during the target year have been borne on the rolls of the company will be entered on the Annual Report (Form 30-b) and considered in making the classification.

—G. O. 25, 1883.

Annual reports will be made by company, troop, and battery commanders on Form 30-b, and by regimental commanders on Form 30-a.

—G. O. 86, 1879; G. O. 97, 1882; G. O. 25, 1883.

Necessary books and blanks will be supplied by the Ordnance Department.

—G. O. 86, 1879; G. O. 43, 1881.

Detailed instructions for making out the annual return are given in G. O. 97, 1882, and under the new classification in G. O. 25, 1883.

Cleaning the Rifle.

50. A brush should be habitually used to clean the inside of the barrel, dipping it in hot water, and afterwards drying and oiling the barrel, as hereafter prescribed. In the absence of a brush, the fouling may be quickly removed by holding the rifle muzzle downward at a convenient angle, and pouring hot water through the barrel, being careful to avoid wetting the breech-block or lock.

51. Unless the regulation brush can be obtained, a wooden "wiping stick" should be used whenever practicable. A metal rod, unless particular care is taken to see that its head is entirely enveloped in the cleaning rag, is apt to injure the grooves of the rifling.

d "In the days when the machine soldier marched in two ranks the men stepping twenty-eight inches moved with a quickness proportionate to the dangerous spaces of the musket projectile of their day. But with such dangerous spaces as the soldier now is exposed to, he must be taught to move from the beginning with a celerity and litheness never before considered necessary."

52. Place a wet rag (woolen, if possible) upon the cleaning rod, being careful to see that its head is equally covered all around, press it into the bore first from the muzzle, and (as the ramrod is shorter than the barrel) afterwards from the chamber, and rub it up and down until the barrel is clean, being careful not to mar the corners of the chamber by the shoulder of the ramrod.

53. Wipe the barrel well out with a rag or tow as before, until it is perfectly dry, and afterwards with an oiled rag. This should always be done as soon after firing as possible. The men should be cautioned that if the barrel be not perfectly clean and dry it will rust, no matter how much oil is afterwards applied. For this reason, in cleaning, warm water is preferable to cold. After oiling, the rifle should be allowed to stand for a time, and then carefully wiped. The slight film of oil left will protect it better than if a quantity is used.

54. Wipe the surface of the hammer, breech-block, firing-pin, etc., with a slightly oiled rag. Close the breech-block and let down the hammer.

55. Benzine is valuable to remove rust and fouling; but unless particular care is taken to wipe the barrel perfectly clean afterwards, it is apt to corrode it.

56. Oil the stock well with sperm or linseed oil, the latter being the best; let it stand a few hours, and then rub it with a woolen rag until the wood is perfectly dry. Repeat this from time to time and it will produce a polish which moisture cannot affect.

57. Care should be taken to prevent water from penetrating between the wood and metal of the piece. This can be guarded

d “The youth of twelve years, whose height is four feet seven inches, steps naturally twenty-eight inches; the soldier five feet four inches will step thirty-three inches by swinging his arms, and when burdened with arms and knapsack, will, on a long day’s journey, if properly instructed to stride as pedestrianism has taught us during the last twenty years, advance thirty-one inches at each step.”

against by rubbing in a little bees’-wax, and the necessity of taking the barrel from the stock, which is objectionable, may thus be avoided.

58. No attempt should be made to drag a ramrod out of the barrel by extreme force when it sticks fast, as the bore is almost certain to be injured by so doing. When such a case occurs it should be removed by an armorer. * * *

60. The hammer should habitually be carried at half-cock, and care taken that the motion of the firing-pin be not obstructed by dust or rust. * * *

65. * * * It is to be remembered that the rifle is a delicately constructed instrument, requiring proper attention, and unless it is kept clean good shooting cannot be expected from it; that the grooves become filled up, and when it is fired the bullet “leads” so that its velocity is diminished, and it falls short; that every man must therefore clean out the barrel of his piece as frequently as possible, and never allow it to be put away dirty, as one night’s rusting will do it more harm than a year’s use. * * *

—*Wingate.*

Rifles may be cleaned only between scores.

—*Page 4, G. O. 53, 1882.*

Wiping Sticks.

As a substitute for the wiping stick, “an almost equally good implement is a strip of heavy harness leather, a foot longer than the barrel, terminating in a broad end, in which

d "The limit of the step needful for the soldier in two ranks with pinioned arms should no longer govern the marksman in one rank."

a slit is cut to enable a rag to be affixed. One advantage this contrivance, first suggested, I believe, by Lieutenant Ray, 8th Infantry, has, is that the soldier can easily carry it anywhere."

—*Captain Fourth Artillery.*

Care of the Rifle.

* * The barrels of military rifles are made as thin as possible to diminish their weight, and, consequently, it is easy to indent or mar them; and once this is done, they are useless so far as accuracy is concerned. The men should therefore be cautioned that in placing the piece in the gun rack, or in stacking it, it is important that it should be handled gently, and under no circumstances should a man sit on his piece or use it for carrying weights, or for any other purpose than for which it is intended. * * *

71. Also, that if any obstruction should find its way into the barrel, either from running the muzzle into the ground or from a wad lodging, it should be removed before the rifle is fired; for if fired with any obstruction of that character, the barrel is liable to burst. * * *

73. * * * The shell of an exploded cartridge should not be allowed to remain in the chamber any length of time, for fear it may adhere by corrosion. * * *

—*Wingate.*

In wiping out use a wet woolen rag, and then an oiled one. If there is any powder caked in the barrel, a brush will remove it. The most approved plan is to pass a wet brush through the barrel, which loosens the crust so that it is easily removed by wiping with a woolen rag; and an oiled rag passed through

d "The instruction of the military cadet to keep his arms stiff in marching—the failure to do which is punished—is in keeping with another barbarous regulation in force at military institutions, which require the cadet to shave."

the barrel leaves it in perfect condition. The fouling is apt to cake in front of the cartridge chamber, and it is indispensable that this place be kept clean to secure accuracy.

In military rifles wiping out is not permitted during a match. Special care should be observed, therefore, to see that the ammunition used is well lubricated. After each shot blow through the barrel, as the moisture of the breath will tend to prevent the fouling from caking; and, for the same purpose, keep the breech-block open until it is time to reload, to allow a circulation of air through the barrel.

—*Wingate.*

Never, except under circumstances of absolute necessity, use an iron ramrod as wiping rod, and then with the greatest care, to avoid injuring the grooves. Too great care cannot be paid to the preservation of the bore. Avoid the introduction of any grit or other substance that might scratch its surface. Use special pains that under no circumstances it shall become rusty. Guard against bending the barrel from blows, or letting the rifle fall, and on this account always lay it down, and not stand it up where it can be accidentally knocked down. Keep the bore oiled by passing through it a clean oiled rag, and leave one in the chamber, closing the muzzle with an oiled cork or rag.

—*Laidley.*

Most men need no caution about taking care of the rifle. Its cost, beauty, and its response to calls to duty, all enhance the affection with which a gentleman regards his rifle. A man who will put his rifle away dirty, or defer its cleaning to a more convenient time, will never shoot well. Ten minutes

d "Such regulation may appear military to the martinet, but is an outrage upon youth and society; for if there is one wholesome check upon folly, conceitedness, and lubricity, one effort towards the encouragement of naturalness, modesty, and earnestness, and in reprobation of hypocrisy more potent than another it is in preserving the adolescent cheek and lip unshorn.

will prove sufficient time to enable the rifleman to clean and oil the barrel, action, and lock thoroughly.

—*Perry's Observations on Rifle Shooting.*

Oil.

Never use sweet or olive oil. Never use kerosene oil. Sperm oil and sewing-machine oil are the best.

—*Perry's Observations on Rifle Shooting.*

Reloading Shells.

One of the facts brought away from Creedmoor by last year's team is that for garrison practice it is unnecessary, and in some respects a disadvantage, to reload the Berdan or Bridgeport shell with the reloading implements. For when the shell is loaded by pressing the bullet in by hand on to the powder, and far enough to retain its position till inserted in the rifle, not only is the work of preparing the ammunition reduced to a minimum, but the shells last as long, and the trajectory of the bullet, when an elastic wad is used, appears to be flattened, and the recoil is diminished.

The shell reloaded in this way could be easier inserted in the rifle if the chamber was longer, but as it is, the breech-block forces the bullet into the grooves without difficulty.

When reloaded shells are to be transported or carried in the belt they must, of course, be reloaded with implements.

—*Experiments at Division Headquarters.*

d “How great will be the achievements of cavalry in future wars when, armed with accurate and handy carbines and pistols, they skillfully fire from their horses in rapid motion, no man can tell to-day, for in this way cavalry have not been taught, and have not attempted, to attack.

All long range bullets are now made with a paper patch, which prevents leading the barrel. The model used in the best rifles is long, smooth, and oval pointed, composed of one part tin to twenty parts of lead, weighing about 550 grains.

With a hardened bullet, shallow grooves can be used in the rifle, and the friction and fouling greatly lessened. It also permits of a heavier charge of powder. The experiments at Springfield have demonstrated that no substantial increase in accuracy is obtained by not inserting the bullet well in the shell, or not compressing the cartridge on the ball.

—*Wingate.*

In putting the powder in the shell, a tube of thirty inches long should be used through which to pour the powder; falling this distance it packs in the shell evenly.

—*Perry's Observations on Rifle Shooting.*

If a tube cannot be had, the shells can be filled by pouring the powder through the rifle. To do this, stand the rifle, securely fastened, on a table, the rammer head placed on a block so as to raise the muzzle a few inches above the table; one man holds the cartridge shell under the muzzle, while another pours the powder in the breech-block opening.

—*Hdqrs. Mil. Div. of the Pac. and Dept. Cal.*

No one can expect to obtain accurate shooting unless precisely the same charge is used every time. It is stated that one grain in a charge of eighty grains of powder will make a difference of nine inches at 1,000 yards. At the same time, a difference of that amount, or of five grains, in the ball makes no practical difference.

d "We know that cavalry now produces great moral results in proportion, as it moves swiftly, and, consequently, is found unexpectedly in the midst of a retreating and disorganized enemy, confronting his carelessly advancing columns, breaking up his trains, interrupting his lines of communication, cutting off his isolated detachments, dashing in where least expected, and getting out of harm's way before resistance can be organized."

Weighing out charges is a most tedious process; it is also unnecessary. Flasks can be obtained which will throw a charge within a grain, and measurement by bulk is much more likely to prove correct than by weight, the moisture of the atmosphere greatly affecting the weight of powder at different times. Major Fulton never weighs his charges, but depends on his own flask, and the same was the case with Rigby and all the Irish team, and their example is generally followed.

By using a funnel two feet long, and pouring the powder in very gradually, 100 grains can be introduced into the ordinary shell, without tapping or shaking it, and without packing the powder, and yet leave sufficient space for the bullet.

—*Wingate.*

In a gun that has a yielding system at the base, like the Springfield, any solid-head cartridge will sooner or later be torn apart by repeated firing, and the result is hastened by the absence of lubrication in the chamber or on the cartridge. In a dry condition the life of the case will not exceed five rounds.

—*Ordnance Note, No. 185, April 3, 1882.*

The reloading cartridges must be slightly lubricated along their *entire length* before firing; and also before firing in each case after being reloaded. This is necessary to avoid rupture and prolong the life of the shell. In the absence of lubricant the cartridge may be moistened.

—*Letter Hdqrs. of the Army, A. G. O., May 10, 1883; Cir. No. 8, Dept. of the South, 1883.*

d "It remains for some audacious cavalry commander not to wait for his infantry foe to become disorganized before attacking, but under favorable condition of ground, and covered by a shrapnel fire from artillery in mass, taking the initiative, advance in open order at a gallop, and open a well-directed carbine fire within 600 yards. If followed by close cavalry supports, aided by the moral effect rapidly advancing horsemen always produce, he may overwhelm his astonished infantry opponents before they have his range, and in minutes accomplish a disorganization, and open a way for infantry, which could only be otherwise accomplished in hours with all arms engaged."

Lubricate the whole body of the shell slightly before the first fire, and also before each successive fire after reloading. This is absolutely necessary and must not be neglected, because when the cartridge is fired dry or only partially lubricated there is a tendency to rupture the shell circumferentially.

Inspect all fired shells and reject all defective or doubtful ones.

After every fire, extract primers, and wash cases in hot water; wipe them dry; lubricate body slightly, keeping interior of shell and pocket free from grease; and in the order named resize, prime (preferably by pressure) load, and crimp. After resizing, remove burrs at the mouth with the scraper. (See Ordnance Notes, Nos. 114 and 231.)

—G. O. 83, *Hdqrs. of the Army*, A. G. O., November 8, 1883.

Initial Velocity.

The standard initial velocity which 70 grains of powder gives a 405 grain bullet fired from the Springfield rifle, the weight of the powder and bullet being in the proportion of 1 to $5\frac{3}{4}$, is 1,350 feet; that is, the velocity at which the bullet moves on leaving the rifle is at a rate of 1,350 feet a second.

No considerable advantage of range and penetration appears to be gained with the service cartridge by increasing the weight of powder beyond 70 grains for the 405 grain bullet.

e

The Sword and Rifle.

"The sword, though discarded, has left a staring vacancy behind it; its place remains untenanted; its functions are discharged by no successor. Its overthrow has entailed such vast and varied consequences that it may really be counted, without exaggeration, among the events which have palpably affected and directed the destinies of humanity. Its effects have been felt in every land and every home; for the disappearance of the sword has radically transformed the character of war and has largely modified the character of men."

But the range of this bullet appears to be increased, using only 70 grains of powder, by placing the powder in the shell, packed, but not compressed, covering it with an elastic wad, and then inserting the bullet by hand until it comes in contact with the wad.

—Experiments at Division Headquarters

For service conditions of rifle and ball, the initial velocity increases with the increase in charge of powder, between limits of 10 and 40 grains, in a ratio of 20 feet *to the grain*, and between limits of 40 and 70 grains, 12 feet to the grain.

Passing the service limit of 70 grains, the velocity increases in a ratio of 6 feet *to the grain* until reaching a maximum of 1,533 feet velocity for 120 grains, the velocity diminishes as the charge of powder increases.

The penetration in the iron-plate target of the 230-grain bullet, with the conditions that gave 2,032 feet initial velocity, was so deep that the usual spattering of lead did not occur, but on the contrary the full body of the bullet was preserved imbedded in the plate.

* * * * The same bullet (230 grains) which had previously entered deeply into the iron plate passed through but 11 inches of pine plank; whereas, the service bullet, which, with the service charge has scarcely any penetration in the iron plate, passed through 18 inches of pine.

The anomaly is explained by an examination of the recovered bullet, which, in the case of the high velocity, flattened

e “The discarding of this universal, indispensable, and perpetual weapon has brought about a transformation of two distinct kinds in the features of European war. Its material result has been the almost total abolition of hand-to-hand hitting; its moral outgrowth has been to change the nature of the courage which is required in soldiers, and to give a new form to the manifestations of that courage. With the exception of such cavalry charges and of such infantry rushes as results in a *mélée* (and they are growing rare in the actions of to-day), there is an end in Europe of close quarters, and of the savage tussels which formerly made up almost the whole of a battle.”

out upon its first impact, and consequently lost its penetrating capacity.

—*Ordnance Note, No. 38.*

“Increase of twist in the rifling, all other things being equal, must diminish somewhat the *initial* velocity of the shot.

“The shot from a rifle has a gyratory motion, which motion increases continually during the flight, until finally the shot must “tumble” if its motion is not arrested. This gyration is a cause of *inaccuracy*, of *diminution of velocity* and consequent shortening of range, and of *decrease in penetration*.

“Increase of twist diminishes the gyration of the shot, and hence diminishes the *retardation* of its velocity, and increases the *accuracy* of its flight. It also increases the distance to which the shot will move before “tumbling.” A greater rate of rotation is *necessary* for a long range than for a short one.

“On the other hand, increase of twist increases that portion of the force of the powder which is expended in producing *rotation*; hence the diminution of *initial* velocity. Hence there is a practical limit beyond which the twist cannot be advantageously increased. This limit can only be ascertained by experiments.

“If experiment with any given rifle, at a particular range, shows any *considerable* gyration of the shot before it strikes the target, then the twist is not sufficient for that range. It is

e "Instead of delivering his stroke with his own arm, and within the reach of his arm, the soldier now transmits his blow through the barrel of his gun, to a distance of a mile or two; instead of demolishing a personal antagonist, whose eyes are glittering at him two feet off, he knocks over an indifferent stranger out of sight. Strength, activity, and hard hitting are replaced by skill in shooting straight and in keeping under cover."

not sufficient to know that the shot has not actually "tumbled" over before striking. The rate of rotation should be such that its gyration will not become considerable before it reaches the target.

"The proposed method of grooving [the Flange method] has one advantage in connection with *accuracy* and *range*, viz.: The form given to the shot is such that the resistance of the atmosphere to its rotary motion is much less than in the prevalent method.

"The suggestion respecting cartridges for long and short ranges is very important. Yet some modern experience, especially in the Russo-Turkish War, suggests the use of great quantities of ammunition for *random* firing at very great ranges. This would require the best cartridges."

—*Maj. Gen. Schofield.*

It is possible to entertain the belief that more duty can be exacted from rifling than that of only giving the projectile sufficient motion of rotation to keep it from tumbling. First, it is possible that it can be required to do, what otherwise lengthening the barrel would less perfectly do, that is, to keep the projectile in the barrel while the full power of the charge is developing.

Second, it is possible that the rapid rotation of the projectile may be found an important factor in increasing penetration, for whilst rifling is found to diminish, to some slight extent, initial velocity, it adds immensely to the average velocity of the projectile.

e "The sword was straightforward and ingenuous; every blow was meant to hack flesh somewhere; it was all in earnest; it was all savage, brutal, and monstrous; it was all blood, and mutilation, and horror; it meant all it did, and had no shame about it."

Not only this, but the fact is likewise recognized that a well trained soldier can be sent into action with two kinds of ammunition, 50 rounds with 85 grains of powder and 500-grain bullets for deliberate firing at all distances beyond 400 yards, and 70 rounds of 55 grains of powder and 320-grain bullets, *for the magazine*, for rapid firing at distances under 400 yards.

For all distances under 400 yards the sight elevation will be practically the same for these two kinds of ammunition, and they will be so dissimilar in appearance, and to the touch even in action, that one cannot be mistaken for the other. Moreover, the cartridges for short range will probably be carried in detachable magazines.

This arrangement will increase the number of rounds which can be carried into action, and reduce the strain upon the soldier when firing rapidly.

—*Letter Headqrs. Mil. Div. Pacific.*

7th. Three barrels (heavier than service) were rifled with seven (7) grooves, .003" deep, twist uniform, one turn in 15" (suggested by Lieutenant Morrison). Grooves were ratchet shaped, after the form of patent No. 39,024, above mentioned.

These barrels now in use by the "Armory Club," with proposed conical cam, and chambered for heavy charges, have made very fine targets at 500 and 1,000 yards—49 points and 31, 35, 43, and 46 points, Creedmoor count, respectively (see inclosure marked "E"). This and inclosure marked "F" show records with 80, 85, and 90 grains of powder, 500 and 550 of bullet, with different proportions of lead and tin patched and crimped in shell, smooth and grooved, at from 200 to 1,000 yards.

No comparisons of velocity and recoil were made with the service rifle and higher uniform twists.

e "Strategy (which means stratagem) has assumed the place of strength and struggling. The object of a campaign is to take the other people prisoners rather than to kill them. Little linesmen, who weigh nine stone, are fancied to be more fit for soldiering than brawny giants are, because they have less weight to carry on a march and can be more easily hidden away in a furrow or behind a bush. Physical power is no longer indispensable, for there are scarcely any occasions in which it can be used."

The results may be summed up as follows: With the same charge of powder, ball, calibre, groove, and the number of grooves, the increasing twist gives the greater initial velocity (thus proving the theory I entertained similar to Colonel Kelton's, except that his refers to greater uniform and not increasing twist of rifling), but on account of stripping of ball and leading of rifle the greater range and accuracy to be expected from increased velocity were not attained.

Penetration is a function of velocity of translation, not of angular velocity, except only so much as the latter may contribute indirectly to the increase of the former. It is not conceived that penetration would be directly increased by increase of angular velocity, but if (all other things being equal), the initial velocity be increased *by* an increase of the angular velocity of the bullet, increased range and penetration would follow.

—A. R. Buffington, Lieut. Col. of Ordnance, Commanding.

Effect of Moisture and Temperature on Initial Velocities.

Powder readily absorbs a certain degree of moisture from the air, and thus varies the amount of work or initial velocity which may be derived from it. The following extracts from Ordnance Note, No. 110, give some of the details of investigations by Captain John E. Greer, Ordnance Department, U.

e "But these transformations in the nature of war, great though they be, are even less striking than the immense changes which have come about in the composition and the demonstration of modern military courage. We all well know what bravery used to be. In the days of steel the soldier very soon got up to his enemy and went at him in person. The employment of distant arms, whether they were slings, or javelins, or arrows, did not keep armies long apart; they got together and battered each other."

S. A. Two kegs of Hazard F. G. powder were selected for the experiment.

"A sample from one was exposed for three days in an open vessel, in a room heated by a stove night and day. At the end of this time cartridges were made up from this sample and also from powder taken from the other keg for the first time opened. Both kegs, however, had been in the room. This powder was reported by the Hazard Company to give a velocity of 1,328 feet. Tested here it gave the following velocities."

Sample No. 1, exposed to dry air three days, 1,391.2 feet.

Sample No. 2, no exposure, 1,340 feet.

The sample of keg No. 1, which had been exposed to the dry air, was next placed out of doors, but under the shelter of a porch, in an open vessel, for three days, during part of which time it rained almost incessantly, saturating the air with moisture. Cartridges were then made up and tested with the results contained in the following table. * * *

The details are omitted. The mean initial velocity obtained was 1,346.8 feet.

"These tables show an increase of 51.2 feet after three days' drying, and a decrease of 44.4 feet after three days' exposure to damp air."

"Samples were then exposed to the drying effect of the air in a heated room for three, six, and nine days respectively, when they were made up in cartridges. These were laid aside

e "The sort of valor required for such fighting as that was of a very elementary and common sort; no training, no obedience, no discipline, no example were required to lead a man to combat when he was in personal danger, when his life depended on his own stoutness, and when he would be killed at once if he did not use his weapon to protect himself. And furthermore, he had the stimulus of physical exertion, of active effort and strife, of passion and conflict."

for a period of four months when they were tested and found to give the following results."

* * * * *

Sample No. 1—Exposed three days in heated room, 1,389.8 feet.

Sample No. 2—Exposed six days in heated room, 1,395.0 feet.

Sample No. 3—Exposed nine days in heated room, 1,406.6 feet.

"This table shows a steady increase of velocity with time of exposure, though the increase in the last six days was much less than in the first three."

* * * * *

"Comparing the mean velocity of sample No. 1 with that obtained four months before (1,391.2 feet), it will be seen that no change had taken place in the powder made up into cartridges during that time. This is important, though the time was very limited."

The foregoing indicates the great influence of moisture absorbed by the powder from the air upon the resulting initial velocity. To obtain uniformity of results it would appear desirable to load the cartridges in a room retained artificially dry, the powder having been previously retained fully exposed in a drying room until samples gave, upon testing, a specified amount of moisture.

For a competition such as is about to be entered into, having once ascertained the most suitable details of bullet, powder

e "His blood was up, and all his senses were concentrated on attack. He had no time to be afraid, and his entire case, corporeal and mental, was opposed to running away. In such a condition ferocity came of itself; it was an unavoidable, self-born result of the situation; all the aids to it were collected round the fighting man; all its sources were present in him, hard at work; he combated in battle as naturally as he would eat at table. There was no high courage in his doings, as we understand courage now."

and lubricant, a sufficient number of cartridges should be carefully loaded as before indicated, using a powder of a single date of manufacture and applying the lubricant in such manner as to insure perfect sealing against the entrance of moisture in the case. Even if the amount of lubricant applied is in excess of what may be actually best for use, it could be removed from the cartridge just before firing. The cartridges made in a single batch should be sufficient in number to cover all possible contingencies of practice and competition. Not alone should the powder be perfectly dry, or at least containing a uniform amount of moisture, but the shells should also be thoroughly dried before filling. The condensation of a very small amount of moisture within a shell will very materially affect the initial velocity. Filling the cartridges required from day to day, neutralizes to some extent the benefits derived from previous practice, as new and unknown variables may be constantly introduced.

The amount of moisture in the air affects the initial velocity also by influencing the character of the residuum deposited on the surface of the bore. This presents more or less resistance to the movement of the projectile through the bore. The greater the absolute amount of moisture present, the softer does the deposit become and the easier does the projectile pass through the bore. As air is likely to contain a larger absolute amount of moisture as the temperature is higher, the elevations required are lessened by the increase of the initial velocities as well as the reduction of resistance of the air

e “The pluck that we ask from our soldiers to-day is of a very different sort. It is indeed so infinitely other and so infinitely higher that it is scarcely possible to make a serious comparison between the old and the new shapes of valiance. The invention of long-range fighting has brought into the world a type of fortitude which has been hitherto totally unknown (excepting in occasional isolated cases), which is just as much a product of our century as railways or electric telegraphs, and which is as distinguishable from the animal courage required for sword-work as is prophecy from fortune-telling.”

To preserve, as far as practicable, a uniform condition of moisture within the bore and retain the deposit in a softened condition, it is noteworthy that the members of the British team persistently breathed through the bore of their rifle in the intervals between firings.

Temperature will affect initial velocities in that when it is low a perceptible amount of the “work” of the powder gases is absorbed in heating the barrel. It also may cause appreciable variations of the relation of the calibre of the bore and the diameter of the projectiles. The first rounds in very cold weather are likely to have low initial velocities owing to this cause. At the higher temperatures the reverse effect obtains, but the difference between the first and succeeding rounds are not so appreciable as in cold weather.

—*Lieut. Zalinski's Experiments in 1883.*

Forces Acting Upon the Moving Projectile

Are the force of gravity and the resistance of the air. In this latter force of retardation lies the whole difficulty. Its law of variation is not known. Mathematicians have solved the problem upon various hypotheses, none of which are accurately true. We know that this resistance for the range of velocities encountered in practice varies with some power of the velocity

e “Instead of dashing at the enemy in fierce excitement, instead of the hot emotion of savage struggle, instead of furious muscular exasperation, instead of the intensest development of the combative faculties, our soldiers have now to exhibit their intrepidity by remaining placid, motionless, undisturbed, amidst a hail of death and wounds. They have to stay quiet under distant fire, to let themselves be knocked to pieces, without the chance or even the possibility of doing anything whatever to defend themselves in an eager, efficient, satisfying form; the one solution open to them is to treat the other people in the same fashion and to pelt impersonal missiles at them from afar.”

between the square and the cube. The actual resistance at any instant is composed of two terms, one due to the inertia of the displaced particles, the other to the difference of atmospheric pressure in front and in rear of the projectile. When, however, the velocity is so great as to leave a vacuum behind, the latter term becomes constant, being approximately 15 pounds per square inch of greatest cross-section. * * *

—*Lieut. Quinan, 4th Artillery.*

*Cylindrical Bullet with an Ogival Head.**

* * * The advantage of this form of head was first discovered by Hutton and Borda experimenting with low velocities. If we suppose each of the projectiles mentioned above to fall indefinitely in the atmosphere, each acquires what is known as its “final velocity.” When the resistance of the air becomes equal to the weight of the projectile, the acceleration ceases, and we have this constant velocity. Every projectile has its own final velocity. The best projectile, other things being equal, is that with the greatest final velocity. A body in motion is sustained in its flight by its inertia. It is retarded by the resistance of the air, which increases with the area of

* The present service Springfield rifle projectile.

e “Not a man on either side has the pleasure of identifying the particular opponent who slaughters him. There is scarcely any of that individuality of carnage which is so contenting in a hand-to-hand fight. And worse than all, there is none of the output of effort, of the bitter strain which necessarily accompanies the exhibition of brute hardihood.”

the surface directly opposed or the greatest cross-section perpendicular to the trajectory. The inertia being proportional to the weight, in spherical projectiles it increases with the cube of the diameter; the resistance of the air with the square of the same dimension. It is thus seen that the larger the projectile, the less it will be retarded. In gunnery we measure the capabilities of a projectile or its capacity to retain velocity by the “resistance on the unit of mass for a velocity of one foot per second.” The less this resistance, the better the projectile. Analysis shows that this is inversely proportioned to the diameter and density; hence the advantage of using solid, large and dense projectiles in preference to hollow, small and light ones.

Oblong projectiles are best, because the mass is greater in proportion to the area of cross-section. A projectile performs *work* in overcoming the resistance of the air and in penetrating or smashing the object struck. The *work* in a projectile at any instant is proportional to its mass or weight and the square of its velocity. We see the advantage first of increasing the weight. The resistance of the air, as well as the resistance of most bodies to penetration, increases with the diameter of the projectile. We see the necessity of distributing the weight so as to diminish the cross section of the projectile. Finally, *work* being proportional to the square of the velocity, we see how important it is to conserve the velocity. The oblong projectile with ogival head fulfills these conditions better than any other.

* * * The relative merit of a projectile, or its capacity to retain velocity, is measured by the *resistance on the unit of mass for a velocity of one foot per second*. The less

“The bravery of to-day is a nervous, contemplative process; there is no action, no movement, no tug about it. It principally consists in waiting obediently until you are hit by a chance shot. Troops do not like it. They are always wanting to get out of it, to rush ahead, to strike, to do something violent and comforting on their own behalf. They feel that it is absolutely unnatural to stand still to be killed, that it is totally anomalous to rest unaggressive under a tempest of ambient peril, that it is contrary to all the tendencies of humanity to make no vigorous attempt to ward off destruction; and yet that is precisely what they have learned to do. They may use shelter if they can find it (it is no longer cowardly to hide), but they may not use action.”

this resistance, other things being equal, the better the projectile. By taking the reciprocal of this resistance, which reciprocal we call “C,” we get a quantity which is a measure of the projectile’s merit, and is directly proportional to the final velocity and to the *duration* of the projectile’s flight when fired at low angles. “C” varies for every projectile. It is a function of the density of the air (this can be neglected, and usually is, as it may be regarded as constant), and of the *diameter*, *density* and *shape* of the projectile. It is greater for shot than shell, greater for lead than iron, greater for oblong than round, greater for long than short, greater for ogival headed than for flat headed, greater for large than for small projectiles. As an illustration, “C” for the 15” solid shot is almost four times, and for the 100-ton gun projectile probably more than ten times “C” for the 12-pounder shot.

The law governing these matters applies equally to small and great projectiles. Taking the service bullet, the longer and heavier it is the greater “C” is. The limiting elements in practice are accuracy and recoil. The deviations become greater as the bullet is lengthened or the velocity is increased beyond certain points. This is corrected by increasing the twist—that is, shortening the length of one turn. Having determined a calibre, twist, length of bullet and the maximum charge which will give good results, to increase the charge

e “The consequence is that our new shape of courage is based on the suppression of direct effort; it has become a passive process, in which we endure instead of acting. The old sword-daring was impetuous, emotional, and intuitive; the new gun-courage is deliberate, logical, and subjective; the one was material and substantial, the other is abstract and theoretical. They are as different from each other as credulity and faith, as astrology and astronomy, as dreams and thought.”

necessitates a corresponding change in some of the other elements—either increase of calibre or increase of twist, etc. * * *

—*Lieutenant Quinan, Fourth Artillery.*

Careful experiments by the Ordnance Department has established the fact that the bullet in passing through the barrel communicates a motion thereto, quite independent and beyond the control of the firer. The results of the experiments referred to are thus recapitulated:

II. There is an actual downward motion of the muzzle of the rifle and carbine at the instant of discharge. This is accompanied by a rear motion, and afterward followed by an upward rotary motion about the point of resistance at the shoulder.

III. The velocity of the rifle cartridge ball in the bore of the carbine is at the rate of 904 feet per second, as against an initial velocity from the bore of 1,210 feet; the interval of time (due to this velocity) in which the system remains connected is the seventeen ten-thousandths of a second.

IV. The dip of the muzzle is well developed at the moment of passage of the ball from the bore in off-hand firing.

V. Before discharge the forces acting on the system are in equilibrio—*gravity* and *resistance* thereto; at the moment of discharge a new force is developed, which either destroys the relation of the other forces, thereby producing the *dip* of the muzzle before the ball passes from the bore, or else springs or buckles the barrel. The practical importance of this dip of

e "Now, how has this strange transformation come about? Where lies its root? Can it really be that it is solely because soldiers go to battle now with guns instead of swords, that this prodigious change in the character of bravery has grown up? Or is there another cause for it besides that one. The answers to these questions are not difficult to find. The influence of sword or gun is, certainly, at the bottom of them, but another and a greater action overlies it."

the muzzle is that for short ranges a small charge of powder holds up the bullèt better than a large charge. This anomaly disappears when the gun is fixed in a rest, which gives a different case, with its own laws for elevation. It would appear from this that it is of the first importance to follow an invariable rule in holding the gun, both as to points of support and pressure against the shoulder.

Ordnance Note, No. 86.

Pistol Grips on Rifle and Carbine.

* * * The pistol grip of the Military Division of the Pacific is even more important on the carbine than the rifle. It is now made of metal at the Springfield Armory, and, like any other Ordnance property, can be obtained on approved requisition at Benicia Arsenal.

This, and a broad covered front sight, which will enable the carbine to be accurately leveled, and protect the front sight from becoming worn or polished, and a small screw placed in the block which moves between the guide-bars of the rear-sight leaf slide to prevent the lateral motion of the slide, and a holster into which the carbine can be quickly disposed of, and which will prevent all injury to it, appear to meet all the wants at present expressed by the 1st and 6th cavalry.

If these wants are generally felt by company cavalry officers they should, if they adopt the devices proposed, or present better, make known their wishes to the Commanding Officer Benicia Arsenal, through their Department Commander.

e "The use of the sword was essentially personal, while the use of the gun is, as essentially, impersonal. The sword was the expression of the individual man who fought with it; the gun is a machine. Each sword had its own special manner of operating, its own particular method, according to the hand which held it; while each gun is but one in a total. The sword could not be wielded without liberty; the gun cannot be worked without system. The one means independence, the other means discipline; and there—in that last word—is found the true secret of modern courage."

The pistol grip, broad covered front sight, and cartridge with the 500-grain bullet and 70 grains of powder, are expected to do much to improve-carbine practice, and to make it up to 600 yards very little, if any, inferior to that of the Springfield rifle.

—*Letter Hdqrs. Mil Div. Pac. & Dept. California.*

SUGGESTIONS TO RIFLEMEN

When Preparing Themselves for a Contest.

Protecting the Eyes.

While training, every effort must be made to save the eye from useless and hurtful effort. Looking at the target and watching the marking while others are firing, is a most serious tax upon the optic nerve. To do this there is an almost irresistible impulse, but it is entirely unnecessary, and, in most cases, positively injurious. Those of the team not firing should turn their back upon the targets, look upon the green sward, and engage in pleasant conversation, keeping posted upon the firing by the score-caller, or, better, not permitting themselves to know anything about it, at least till after they themselves have fired.

e "The swordsman was himself alone, therefore his qualities were positive; the shooter is a unit in a regiment, therefore his qualities must be negative. We see proof enough of that at every match. The men who win prizes are precisely those who are animated by the least emotion, who have reduced themselves the most completely to a condition of impassibility. The difference between the swordsman and the rifleman is as great as between the Japanese workman, who never reproduces the same pattern twice, but throws a fresh invention of his own into every object he fashions, and the Birmingham artisan, who goes on mechanically making the one same identical spoon or tray throughout his life."

Until coming to the score in a contest, each rifleman, while on the range, and when practicing, should wear a student's visor of green baize, fastened under the visor of his cap. Baize is suggested, as from this material there is no reflection.

The Eye Sun-bath

Should be taken in the morning before 10 A. M., and in the afternoon after 3 P. M.

It consists in closing the eyes and allowing the sun rays to fall full upon them for from three to five minutes at a time, four or six times a day. The countenance and mind should be composed. The head should be turned away upon opening the eyes, and the light admitted to the eye gradually.

The same degree of benefit to this special organ will be experienced from this treatment as the muscles of the athlete derive when subjected to the sun for an hour daily in preparing himself for a contest.

The treatment is simple, is easily and inconspicuously applied, and can be increased or diminished as may be found desirable by the person in training.

Diet.

In preparing for any special effort—whether for a game of billiards or a foot race—whether by a surgeon for some critical

e “And yet, though the independence of the sword is, manifestly, a more intellectual condition than the discipline of the gun, it is discipline, not independence, which has generated the loftiest type of courage that the world has seen. It is discipline alone which has popularized coolness, by enabling entire armies to acquire and practice it. Single examples of it have existed since history began; but it is in our day that, for the first time, hundreds of thousands of men exhibit stoicism together.”

operation or the rifleman for the best exhibition of his skill—the diet must be regulated and confined to special kinds of food.

It has long since been ascertained by men in preparing for an effort where control over and much display of nervous and muscular energy is required, that a diet of meat, with as little farinaceous and vegetable food as possible, and without stimulants, should be adopted.

Riflemen should, therefore, for one or two weeks before, and during a contest, live upon beef, mutton, game, and poultry, fresh fish and eggs, with stale bread, dry toast, and oatmeal porridge with milk. Pork in every shape should be eschewed. The meat should be roasted, broiled, or stewed, *never fried*. Bread should be at least 48 hours old. No pastry, sweet cakes, or hot cakes, should be tasted. Turnips, radishes, parsnips, beets, beans, and peas, should be cooked with soda if eaten. Cucumbers and green corn should be given up. Potatoes, tomatoes, onions, apples, melons, pears, peaches, oranges, grapes, and berries, may be indulged in moderately. Water-cress, everywhere obtainable, should be eaten once or twice a day.

No spirituous or fermented drink, and as little coffee and tea as possible should be drank. The use of tobacco, whether in chewing or smoking, is pernicious. If all self-indulgencies can be altogether given up, without deranging the system, they should be. The best drink for thin men is milk, warmed to 110° or 120°, where a warm drink is desired, as at the morn-

e "There lies the reply to our questions. The actual shape of military courage is the fruit of a particular training, which has suppressed the importance of the parts by transferring it to the whole. That training was unattainable while the sword forced fighters to be individual. It has only become achievable since the gun has obliged soldiers to be collective. Here, at last, is a point on which the sword has to confess itself beaten."

ing and evening meal. For stout men the best drink is weak tea, with a slice of lemon or lime, and a little of the juice. Meals should be taken with absolute regularity and in comfort, slowly, and permitting nothing to interrupt them nor agitate the mind; at the same time, the feet should be warm, and at least a half hour's interval should elapse before being called upon for any special exertion.

With a simple diet there is no danger of eating too much. Riflemen should live generously. While in their case great muscular development and endurance are not essential, yet strength and suppleness are very desirable. Therefore, while fatiguing exercise, particularly lifting heavy weights, must be avoided, brisk short walks of a mile or two, a few times daily, making occasional spurts so as to open the lungs and bring on perspiration, are very beneficial. The walker should come in slowly and saunter around till cooled off. If he lies down at any time, he should, if the least warm, cover himself lightly.

The calls of nature must be heeded and attended to at the individual's regular time; if possible, in the morning before the work on hand begins. This is very important. When the "habit" is interrupted for one day, nature should be helped at the regular hour with an enema rather than with medicine.

As late hours and a bad night's rest, from any cause, must disqualify a rifleman utterly from contesting next day in a team match, there should be the utmost frankness on the part of members of a team in telling whether they slept well or not.

The slight nervousness which the best soldier and most skillful riflemen may often feel, can be, when anticipated, corrected

*f**Infantry—Position and Cover.*

“Infantry is the principal agent in battle, as well as the principal support to all other corps. When it advances, forcing back the opposing lines, and occupying the positions so obtained, the victory is gained. When it holds its own ground, standing firm, and wrestling with the enemy without looking back, the victory is, perhaps, uncertain, but may be gained by fortunate manœuvres or a last effort.”

by a little moderate exercise—a walk of a few hundred yards, swinging the arms freely and taking deep respirations. When constitutional or due to some imprudence, it is best corrected by administering at the proper time, and by the advice of a physician, a nervine—particularly bromide of potassium.

Bathing.

Each man, while training, should take a bath to his waist in temperate water (70°) at least once daily. This should be done out of draft, rubbing arms, chest and shoulders not only dry, but till they glow. Twice a week each should have a full bath for fifteen minutes in water 82°.

Sleep.

Sleep all that is possible. Retire at 9 o'clock. Rest, even if not sleeping, till 6 A. M., or later, if the room is well ventilated; if not, rise on first waking. Those who have been in the habit of breakfasting early should, so soon as dressed, take a drink of warm milk and a cracker, and take a moderate walk till breakfast.

Practicing.

It must be remembered that to make a high score off hand at 200 yards is more difficult than to make a high score at 500 or 600 yards lying down. Yet it must not be inferred that, because a rifleman can shoot well at 200 yards, he can shoot

f "When, governed by events, it retreats farther and farther, without being able to obtain strongholds which the battle-field offers, or to advance and take the offensive, defeat is at hand. The position of Infantry also regulates the advancement, and controls the 'morale' and hopes of the entire mass, and when its mission is fulfilled it resumes its permanent duty of marching day after day in a heavy equipment. It executes all great works, and watches night and day over the safety of all. It is the instrument of strength and endurance."

well at 500 yards; still less that, because his practice is good at 500, that he will necessarily shoot well at 600 yards. Each range has its special difficulties, which practice alone will enable the rifleman to surmount. The opinion of the Creedmoor team is that general practice should be at 300 and 600 yards, for good practice at these distances will generally guarantee good scoring at 200 and 500 yards.

Three, or at most four days out of seven, is often enough for team practice.

Any rifleman who can score 84 per cent. in ten shots at 600 yards should immediately commence practicing at 800, 900 and 1,000 yards.

Sighting.

It is not only unnecessary, but will be found by most persons an absolute disadvantage, to shut one eye when firing.

The sight can be more quickly taken, and with equal accuracy and with less strain upon the vision, with both eyes open. Anyone, however, preferring to sight with the vision of one eye excluded, will find that placing a screen over the eye is better than closing it.

Captain of the Team.

As the Captain, in order to bring out the best efforts of his men, should not try to control them arbitrarily, merely as a military organization, but as comrades, having in view a common object in which all are equally interested, it is therefore

f "There is immense advantage of cover for infantry. In no other way can we have accurate firing, otherwise the men fire at random, omitting aim entirely, and many not even bringing the gun to the shoulder. To render accuracy possible, the soldier should be in a place of security, behind a wall, a tree, or far better, in hastily-made rifle-pits, such as were used by us in the last years of the war. The soldier then is not disturbed by a sense of his own danger, his mind is clear, and he will invariably carefully aim his piece."

particularly necessary that the members act towards him with the greatest consideration, yielding their personal opinions, without controversy, to his instruction, advice and wishes. It is unnecessary to say that the captain should not shoot in an important full team match. He will have all he can do in actively looking after the interests of his team, which will unfit him for participating.

The captain should, however, practice with the team, and keep a record of each shot fired in practice.

In this record the elevation with which each rifle is fired, the allowance for wind, its direction, and the kind of light, should be carefully noted.

After each two days' firing the standing of the team should be readjusted and announced.

The captain should examine each member of his team in the morning, an hour before a contest, in which a failure must affect the hopes and expectations of many people. He should make every proper inquiry to ascertain if their physical and nervous condition will warrant him in taking them to the score, or better, have a physician to pronounce upon their condition. If they have any doubt themselves, they should hasten to make it known.

The Coach.

Rightfully, a coach should not be employed in a match, but each rifleman should depend upon his unaided judgment in regard to elevation, force of wind, drift, light, etc. So long, however, as it is usual for certain teams to employ a coach, it

f "When it is possible the best shots of the regiment should be posted under charge of select officers, either single or in small groups, so that they may, by their superior skill, accuracy, and persistency of fire, pick off artillerymen, cause troublesome bodies of troops to withdraw, annoy mounted men and officers, and generally harass the enemy."

must be done by all to place them on an equality. He must be the most experienced and observant shot of the team. He should not fire in the match. He must be an imperturbable person, having gentle manners and sympathetic voice. For the time being, the firer must give up entirely to the coach's judgment. If neither the captain nor any member of the team is qualified for this duty, then some disinterested rifleman, who is thoroughly acquainted with the range, should be engaged. The coach should be provided with a first class telescope and tripod, and a miniature revolving target, and pins with which to show each man exactly where his successive shots strike without his being obliged to watch the target.

Marking the shots is properly the distinct duty of one of the team, designated the "spotter;" and if there are enough members in the team, one should be assigned this duty, so as to allow the coach to give his undivided attention to the firing.

As the targets at the great ranges are always close together, those firing can not be reminded too often in a low tone, by the "coach," or some one near them, which is the *letter or number of their target*.

Some important matches have been lost by throwing away a bull's-eye on the wrong target.

At the Range.

At the range, the men, in order to fire their best, particularly if grey or blue-eyed men, should take their positions feeling in a glow—indeed, perspiring slightly. This they can bring on by a walk of a few hundred yards and by slowly taking deep respirations. Such moderate action will generally relieve all

f "The ultimate object of war is to get at the enemy and by superior prowess to force him away from his position. When forced to act on the defensive, the object will be to keep off the enemy and hold fast to positions."

nervous agitations. It is hardly possible to be nervous with the blood circulating freely and the lungs in full play.

In any event, all riflemen, shortly before commencing to fire standing, should breathe deeply and frequently, and swing their arms freely, but without violence. After commencing to fire he should give his arms all the rest possible, by placing the butt of his rifle on the ground while waiting to fire; if there is the least interruption, he should lay his rifle aside and cross his arms, or better, rest sitting down.

The Utmost Good-fellowship and Harmony Must be Cultivated.

For a team to shoot their best, each member must try to be pleased with and have confidence in himself, and what is more difficult, be pleased with and have confidence in all the others, and under all circumstances be helpful and obliging.

Shoot Slowly.

At most contests each team has one target, at which two men fire alternately. There is allowed $1\frac{1}{2}$ minutes between consecutive shots by the same rifleman; $11\frac{1}{2}$ minutes to two men firing seven shots; 1 hour and 8 minutes to a team of twelve men at each distance.

As the rifle can be reloaded and fired very deliberately in from fifteen to twenty seconds, the rifleman can have $1\frac{1}{4}$ minutes for absolute rest between firings, to ponder upon the result of his shots and to regain his composure, if nervous. If any nervousness is felt at the 200 yards range, particularly if the leg trembles, the rifleman should put his rifle out of his hand and sit all the time allowed him.

f “A position is a stretch of country, which, of itself, offers more or less obstacle to the advance of troops and to the effect of the fire of weapons upon its front. The effective resistance of an army occupying it is increased in direct proportion to the amount of obstacle thus presented.”

As the last two men to fire have the most trying ordeal to go through with, particularly when it comes to firing at the last range, everything should be done to make their time pass pleasantly. They should not be permitted to know anything about the score, and should be backed up by the presence and cheerful words of all the team.

—*Hdqrs. Mil. Div. Pac. & Dept. California.*

EXTRACT FROM THE REGULATIONS
OF THE
WAR DEPARTMENT AND NATIONAL RIFLE
ASSOCIATION OF AMERICA,
FOR THE GOVERNMENT OF
RIFLE COMPETITIONS AT DEPARTMENT HEADQUARTERS.

General Regulations.

During the progress of a match, no one, except the officers, directors, and employés of the range, the competitors and the scorekeepers, will be permitted within the ropes, without special permission of the Executive Officer.

The squads of competitors should be stationed some yards in rear of the firing points, where each competitor should remain until called by the scorekeeper to take his position at the firing point, and until he has completed his score. The scorekeepers will be seated close to and in rear of the firing point stakes.

f “Whenever a body of troops, of any size whatever, has reason to anticipate contact with a body of the enemy of superior fighting power, it must of necessity seek the aid of position and cover.”

Scorekeepers shall, as each shot is signaled, call in a loud voice the name of the competitor and the value of the shot, and at the conclusion of the score of each competitor, announce in like manner his name and total score.

Competitors must pay attention to the scores as announced and recorded, so that any error may be promptly investigated.

All competitors will be allowed to examine the records of the scorekeeper during the progress of any match.

All protests and objections must be made to the Executive Officer, or, in his absence, to one of his assistants in charge. In case a competitor is dissatisfied with the decision of the latter, he may appeal to the Executive Officer.

Any competitor feeling himself aggrieved by the ruling of an Executive Officer, may make to the Secretary a statement of his grievance in writing, giving the names of two or more witnesses in the case, which shall be handed to the Adjutant General of the Department.

These regulations, and such special rules or directions as the Executive Officer may give, must be rigidly complied with by competitors and all other persons upon the range grounds.

Marking, Scoring, and Signaling.

Bull's-eye counts 5; signal, white circular disc.

Centre “ 4; “ red “

Inner “ 3; “ white and black disc.

Outer “ 2; “ black disc.

Ricochet, scored R; “ red flag waved twice right and left in front of the target. Ricochet hits will be marked out after the flag signal.

Any objection to the record of a shot as signaled, or to one not signaled, must be made before another shot is fired. Any

f "If the ground does not afford cover it must be improvised. The almost universal resource for this purpose is dirt. In addition to the usual intrenching outfit of an army every foot-soldier, and, perhaps, every soldier, should have the means of constructing earth-cover for himself rapidly in an emergency. This is rendered absolutely necessary by effectiveness and rapid availability of fire of the war-weapons of the day."

competitor challenging the marking of a shot shall first deposit with the Executive Officer, or his representative, the sum of \$1.00. If his challenge is sustained, the money shall be returned. In case the challenge is not sustained, the money shall be forfeited to the Association or the Range.

Any alteration of a scoring ticket must be witnessed by the officer in charge of the firing point, and endorsed with his initials.

Matches.

The matches will take place, if possible, at the hour previously named. Any deviation from the programmes will be posted upon the bulletin board, as long before hand as practicable. *The posting upon such bulletin board will be considered sufficient notice to all competitors of everything so posted.* It should be examined by all competitors daily, both morning and afternoon, before the shooting commences.

Shooting.

Competitors must be present at the firing points punctually at the time stated upon their tickets, or forfeit their right to shoot.

After a competitor has joined a squad he shall not quit it until he has completed his firing or retired.

No two competitors shall shoot in any match with the same rifle, nor shall a competitor change his rifle during a competition, unless expressly permitted by the terms of a match, or unless his first rifle has become unserviceable through an acci-

f “He must be provided with a tool for handling dirt. The principle involved in this matter is well established. The ground must first be broken up with a point of steel, after which it must be scooped up and thrown into place. The former is of the most consequence. When dirt is loose or soft it can be handled by a man in a great many ways. He can even scoop it up and throw it in place with his hands, but he must have a tool to break it up and loosen it.”

dent, which must be verified by the officer in charge of his firing point.

In each match of the annual meetings, except where otherwise stated, the squad or team assigned to each target will be required to commence firing at the time named on the score card, and to continue firing at the rate of one shot per minute until the completion of the score.

In case a competitor, without fault on his part, has been prevented from finishing his score within that time, he may apply to the Executive Officer for further assignment, the granting of which will be in the discretion of that officer.

Competitors retiring from matches forfeit all claims therein.

In all competitions restricted to military rifles the competitors shall place themselves at the firing point by twos, and shall fire alternately until they have fired all their shots.

Whenever the danger flag is displayed, competitors about to fire will be required to open the breech-block of their rifles (if breech-loaders). If they leave the firing point they must withdraw the cartridge.

Any competitor delaying his squad will be passed by. In no case will the firing be delayed to enable a competitor to procure a rifle.

Position.

In all military matches with the rifle, the positions are: Standing at 200 yards, kneeling at 300 and 400 yards, and lying (in any position within the rules) at 500 and 600 yards.

In all cases the rifle shall be held clear of the ground.

Firing at 400 yards will be at the *B* target.

f “This steel point might be the bayonet, but it is a false principle to use a weapon for any purpose other than a weapon. It might be placed on the end of the handle of a small spade. In use, the soldier could get down on his knees, and holding the tool with spade up and handle down, his arm serving as a pick-handle, he could break up earth pretty fast.”

Ties.

Ties shall be decided as follows:

IN INDIVIDUAL SHOOTING.

When the firing takes place at more than one distance, by the total score made at the longest distance; and if still a tie, and there be three distances in the competition, by the total score at the second distance.

By the fewest MISSES in the entire score.

By the fewest OUTERS in the entire score.

By the fewest INNERS in the entire score.

In handicap matches (after the preceding), by the fewest CENTRES in the entire score.

If still a tie, by inverse order of shots, counting singly from the last to the first.

By firing single shots at the longest range.

IN TEAM SHOOTING.

The name of competitors who have to shoot off ties will be posted on the bulletin board as soon after each match as practicable.

When the ties are shot off, one sighting shot shall be allowed without charge.

Competitors not present at the firing points at the hour named for shooting off ties, lose their right to shoot.

Penalties.

Competitors must make themselves acquainted with the regulations, as well as with the conditions of any match for which

f “The use of the spade part is obvious. This part should be a very light, strong, rectangular plate of steel, about seven inches long and six inches broad, with spade edge on the bottom and knife edge on the two sides. The latter would make it a cutting tool for the manifold purpose developed in a campaign. The weight of this tool would be trifling. The handle, if detached, should be slung to the belt, while the spade could either be carried there with it or worn as a breastplate.”

they may have entered, as the plea of ignorance of either of them will not be entertained.

DISQUALIFICATION.

Any competitor—

Who shall fire in a name other than his own, or who shall fire twice for the same prize, unless permitted by the conditions of the competition to do so, or—

Who shall be guilty of any conduct considered by the Board of Directors or Executive Committee or officer as discreditable; or—

Who shall be guilty of falsifying his score, or being accessory thereto; or—

Who shall offer a bribe of any kind to an employé, shall, upon the occurrence being proved to the satisfaction of the Board of Directors or the Executive Committee or officer, forfeit all his entrance fees, be for ever disqualified from competing at any time upon the range of the Association, and shall not be entitled to have any prize won by him at the time or meeting awarded to him.

EXCLUSION FROM FURTHER COMPETITION.

Any competitor who shall be detected in an evasion of the conditions prescribed for the conduct of any match, shall be ruled out of such competition.

Any competitor, in any meeting or match, refusing to obey any instructions of the Executive Officer, or his assistants, or violating any of these regulations, or being guilty of unruly or

f "The principle of cover is involved in the following general proposition: that army will always be the most successful which can, under any and all circumstances, make the most liberal drafts upon the powers of nature."

disorderly conduct, or being intoxicated, will be immediately ruled out of all further competition during such meeting or match, and forfeit his entrance fees; and may also be reported to the Board of Directors or the Executive Committee, and be by them disqualified from the use of the range.

Any competitor firing when the danger flag or trap disc is shown at the target or firing point, or knowingly discharging his rifle except at a target to which he has been assigned, or into the blowing-off pits, or as may be directed by an officer, shall be debarred from all further competitions during the meeting, and shall forfeit his entrance fees. This shall not apply to a competitor accidentally firing at the wrong target, when no danger disc is up.

Any person discharging a rifle or snapping a cap within the enclosure, except in accordance with the regulations for shooting, may, at the discretion of the Executive Officer, be required to leave the ground.

Any competitor or other person found with a loaded rifle except at the firing points and when about to shoot, shall be debarred from further competition during that meeting or competition.

Any person, whether a competitor or not, interfering with any of the firing squads, or annoying them in any way, will be at once expelled from the ground.

Any person firing on a wrong target will be fined \$1, or be debarred from further competition; or both, in the discretion of the Executive Officer.

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Formation and Duties of Infantry in Battle.

“The general principles already universally accepted by three at least of the great Continental powers may be summarized as follows:

1. “The relative value of the firearm (cannon and musket) and of the side-arm (sword and bayonet) has been much affected by modern technical improvements. The firearm is now undoubted mistress of the battle-field, where everything is subordinate to it.”

PISTOL PRACTICE.

To make expert marksmen of men on horseback, instruction will be given on foot until a fair degree of proficiency is attained—this with the carbine should be fifty per cent. at two hundred, three hundred, and five hundred yards (see “Laidley,” par. 522), and with with the pistol fifty per cent. at twenty, forty, and sixty yards. Whenever practicable, all practice on foot should be in the presence of the horses, so as to accustom them to the noise. As soon as the troopers have reached these degrees of proficiency, they will be instructed in firing with the pistol from on horseback, in which blank cartridges should at first be liberally used for the purpose of preliminary training to both men and horses. After this, *ball* cartridges will be used.

The firing will be at target “A,” and in all cases, whether with the pistol or carbine, the gallop will be the gait employed.

The first practice with the pistol will be at ten yards’ range; this to be increased by distances of ten yards up to sixty. For each range the trooper will start at thirty yards from the prescribed firing point, and deliver his fire as he crosses it, keeping his horse well in hand and pulling up as he reaches the target, to see the effect of his shots and have them recorded by the marker. As soon as good practice is obtained by this method, the troopers will be exercised at firing two or more

g 2. "The formation of infantry for battle must be such as to favor to the utmost the effect of its own fire, and to minimize the damage done by that of the enemy. Within effective ranges everything else must give way to these two considerations."

shots in succession; in this the trooper should be made capable of firing two shots between the thirty and ten yards' firing points, three between the forty and ten, and four between the sixty and ten. When sufficiently advanced in this sort of firing, instruction should be commenced with firing in retreat. For this the start will be from the target, wheeling half right and firing at each range from ten up to sixty yards.

After this, firing mounted, with the carbine, can be undertaken and conducted in the same manner, commencing with the thirty yards' range, increasing the distances by twenty yards up to two hundred and ten. The gait will be the gallop, but at first the fire will be delivered at a halt, the trooper pulling up short to deliver it, and then immediately resuming the gallop. This will be continued until the men are sufficiently advanced to fire while the horse is moving at that gait.

In firing in retreat, commencing with the thirty yards' range, the horse should be half wheeled to the left and pulled up short.

After the troopers have acquired a fair degree of proficiency in the foregoing exercises with the carbine, they may be exercised at leaping from their horses, delivering a fire quickly, then mounting and galloping to another point, repeat the operation. These exercises should be at ranges from two hundred to six hundred yards, and both advancing and retreating.

Within two hundred yards the pistol may be used in the same exercises.

As success in mounted firing depends chiefly upon the ability of the trooper to take quick and accurate aim, dismounted exercise in *snap* shooting should be extensively practiced.

Reports of all firing will be made in accordance with the rules prescribed for rifle practice, the blank forms supplied for that purpose being modified as may be necessary. In making

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- g 3. "For the front or 'firing line' the only formation, both in attack and defense, which meet these requirements, is a line of small sections extended in single rank, a line of skirmishers, which, from being at first very open, become more and more dense as the antagonists come to closer quarters, attaining at last almost the consistency of a line in close order."
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out the reports care will be observed to specify in marginal remarks the arm used, whether the firing has been mounted or dismounted, delivered at a halt or when moving in advance or retreat, and, in short, every condition that will assist in establishing a standard for instruction in mounted firing practice.

Four hundred rounds of ammunition per annum for each man for the carbine, and the same amount for the pistol, is authorized for the target practice. This allowance may be expended at such periods in the year as department commanders may think best suited to the circumstances of the case.

—*G. O. 57, Hdqrs. of the Army, A. G. O., May 24, 1882.*

Instruction for firing the pistol from the horse is well established. It is difficult, however, to analyze the method practiced by the best shots, or describe it except in a general and rather vague way.

In the first place, pistol shooting, owing to the unsteady support the hand gives the weapon, should always be according to the "snap" method; that is, the eye is not taken from the object to look along the pistol, nor should any effort be made to align the pistol between the eye and object. The best results are obtained when there is hardly a perceptible pause between quickly projecting the pistol and firing; no attempt being made to look along the barrel to see if it points at the object. The pistol bullet must be directed instinctively, as is the arrow from the bow, or the stone from the sling. The cavalryman must do this first dismounted, for there is no other way of delivering the pistol "blow" when mounted.

The same is true of carbine firing mounted, when the horse is in motion at the gallop.

g 4. "This 'firing line' has a very different mission to that of the old 'line of skirmishers.'

"The latter had only to prepare the way for the columns or lines and to supplement their efforts; the former, on the contrary, has to fight the battle out through all its stages to the very conclusion, being supported in doing so by the troops in close order. Hence the conditions are reversed."

By the following method great skill is usually soon attained in pistol firing at an object in front, rear, or on either side; when moving or still; when both the firer and object are moving; when firing at an object only seen for a moment, the eye taking only its direction and speed; or when firing with two pistols at two objects in divergent directions and at different distances.

It must be admitted by the cavalryman that he should be able to give all such pistol "blows," if possible, and the surprise generally is, if he does not succeed when the following directions and suggestions are carried out.

The first principle to observe in rifle or carbine firing, and especially in pistol firing, is to extend the thumb when holding the handle. It must be extended as nearly as possible in the direction of the bore of the weapon, and not grasp the handle. This extension brings the thumb along the left side of the pistol-hammer; and the inner end of the handle should rest over the little finger. This method of holding gives the necessary and all possible support to the weapon.

Experience has shown that the extension of the thumb along the top of the stock in the prolongation of the forearm enables the weapon, whether rifle or pistol, to be not only quickly aligned on the object, but, after a little practice, to be thrown into accurate alignment with it from any position, and fired without looking at weapon at all.

For small and medium sized hands the handle of the Colt pistol is most acceptable; the Smith & Wesson suits large hands best. But neither of these handles fit the hand as they

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- g 5. "The intermixture of tactical units, which, under the present conditions of warfare, occurs more frequently and on a larger scale than formerly, is an inevitable evil. All that can be done is to put it off to as late a stage of the battle as possible by means of tactical dispositions, and to minimize its bad effects by training and discipline."
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would be made to do if manufacturers knew how they had to be used to the best advantage.

There is but one way for the military to hold the loaded pistol while mounted or dismounted—that is "raised."

Snap firing, the only kind which men mounted can adopt with advantage, should begin on foot, at black pasters stuck about on a canvas target five paces distant.

In firing, the eye must see only the object, and the pistol must be projected at it and fired with the same motion and rapidity that a missile is thrown from the hand, from the same raised position of the arm. The bullet should leave the pistol just as the thrown missile does the hand, the object at which the projectile is thrown being alone noticed.

As the firer instinctively *feels* the way to throw the bullet (for he must not even glance at his pistol) and acquires skill, the distance from the object should be increased two or three paces.

At 10 or 12 paces he should, after glancing intently at the object, look away and then fire; with the back to the target, standing in the position of "Guard," look over the right shoulder and fire; occasionally fire across the body, the left side being towards the target. This first practice up to 15 yards should be with reloaded shells, 10 and 12 grains of powder, and the round dropped ball, 44 calibre.

So soon as good firing is made at 15 yards, instruction after the same manner, at a 4-inch bull's-eye, with 16 to 20 grains of powder and the 230 grains bullet, should be continued up to 50 yards, increasing the distances of the firing points by five paces at a time. Beyond 50 yards the regulation cartridge and bull's-eye should be used up to 100 yards.

g 6. "The same training and discipline must regulate infantry fire. If this is to be of decisive effect it must not only be hot and well sustained, but it must also be entirely under control and conducted according to fixed principles so as to be concentrated upon any point desired."

Mounted firing with the pistol, reduced charges, should begin so soon as good firing is made at 15 yards, and be carried on along with dismounted firing, on alternate days or weeks.

The foregoing gives at least an insight into, if it is not a description of, the best method of revolver firing. No attempt is made to explain its reasonableness, but those who have pursued the aiming method, and have doubts about the snap method, should give it a trial by some of the bright young troopers. The older and differently instructed soldiers will hardly otherwise be persuaded to adopt it.

At first rather wild shooting must be expected. But if the practice is begun with reduced charges, the surprise will probably be at the rapid improvement, and at the increased interest, and the great and immediate skill attained in mounted firing; this, after all, is the object desired.

The Cushing truck target affords the best means of instruction in firing at a moving object.

These movable target supports, now supplied by the Ordnance Department, have superseded all others in this Division, and must throughout the Army as soon as their advantages are understood.

* * * There are pistol shots who think the handle of the cavalry pistol should be better fitted to the hand; and that the hammer now prevents the thumb from occupying the position it should, in order that the pistol may be used to the best advantage; that a recess should be made in the stock where the screw of the back strap now is, for the little finger to fit in, to prevent the pistol from dropping when projected in the act of firing.

g 7. "A tactical body once thrown into a firing line on the offensive cannot be relieved; its remnants, great or small, will remain in the firing line to the end of the action.

"This rule will not apply so generally to troops on the defensive."

In every art the tool best suited for the work in hand will certainly enable the workman to achieve the best results.

To make the best use of the pistol the cavalryman, when firing, must place his thumb in the prolongation of the forearm; this not only to give quicker and truer direction to the projectile, but better control of the weapon when it recoils. The remarkable recoil of the pistol follows from their construction, the point of support in the hand being so much below the line of recoil in the barrel. The objectionableness of this recoil is much overcome by extending the thumb over the grip as proposed.

The "blow" with the pistol should be delivered after the same manner as the "cut over the point" with the foil. To make this cut successfully it is absolutely essential that the thumb be extended along the grip; it is equally essential, in making the pistol "blow," that the thumb be extended along the handle, in the prolongation of the forearm, and, if possible, directly in rear of the barrel. One should no more attempt to sight the pistol than the foil in making a blow; but, looking at the object, give the weapon true direction by the hand: to do which the thumb must be extended on the grip. Although this has been well established, probably ever since pistols were made, certainly ever since they were used in the duel, it is not generally known and it seems not to have been taken into consideration by revolver manufacturers. To admit it now and in consequence modify the cavalry revolver would be expensive to manufacturers and to the Government. That it is true, and will be of inestimable advantage does not follow because it is the opinion and experience of a few men. It should be generally established in the Army, and a demand for a modification of the pistol be generally presented for valid and cogent reasons,

g 8. "The comparatively loose formations necessary in the present day render supervision and control on the part of superiors more difficult. Tactical dispositions will again do something to remedy this evil, but thorough discipline and training will do more, contributing as they will to the complete maintenance of the chain of responsibility from the commander-in-chief right down to the leader of the smallest squad in the fighting line."

before the Chief of Ordnance and the superintendents of arms manufacturing companies can be expected to consider a proposition which will entail considerable expense.

The reason for this thumb extension is a physiological one; its advantages arise from the fact that thereby is best secured that opposition of the thumb and forefinger which give the hand its wonderful power of manipulation.

In the usual way of holding the pistol, owing to the form of its handle, the best use of the thumb is not, and cannot be, made; that is, the use of one most important factor in the nice manipulation of a delicate instrument is hardly called into requisition at all.

How to arrange the pistol stock so as to enable the thumb to be extended as proposed, as well as to enable the weapon to be more conveniently and readily cocked, is not difficult, and, as an expedient and experiment, not at all expensive. It can be done tentatively by the handy man of every troop, by cutting a grip in two pieces out of some moderately hard wood with his pocket-knife, placing nearly all the wood of the stock on the right of the back-strap, and prepare a place for the ball of the thumb to fit it. The axis of this stock will not be in the same plane as the axis of the barrel, but to the right and parallel, and to this extent is a disadvantage.

The comb of the hammer should be depressed nearly 70° , so that when down it is about parallel to the barrel, and should be broadened and bent 15° to the left, so that the thumb will not be injured by the recoil, and canted 10° to the right, so that the thumb may rest flat upon it in the act of cocking.

g 9. "The importance of the company as a battle unit is much increased, and *pari passu* the importance of the captain as a commander."

The trigger should be made broader and stronger, and inclined to the rear, so that it will be perpendicular to the force applied in pulling it.

—*Letter Headqrs. Mil. Div. Pacific*, 1883.

Commanders of light batteries will carefully instruct their commands, so far as armed with this weapon, in the practical use of the pistol.

—*G. O. 1, M. D. A.*, 1883.

Instruction in Mounted Firing.

It has often been suggested of late years that additional time may be afforded cavalymen for important duties, when cavalry officers can bring themselves to recommend that burnishing the sabre and scabbard be dispensed with by turning them into the Arsenals. For all the advantages cavalry can derive from exercise with the sabre—and this weapon is now admitted by many cavalry, and generally by other military men, to be useless except as a light implement for limited exercises—can be secured from the game of Polo, together with many other advantages which the sabre does not encourage.

Experts report that the few horses that do not readily become accustomed to firing by being present at dismounted pistol and carbine practice, so that they will eagerly follow their riders when firing on foot, and stand or remain in hand when their riders fire from the saddle, can be made to do so in a few lessons according to the Rarey method, partially applied (the fore-leg strapped up); or, according to the Indian and Mexican method. The latter method is to pass the loop of the lasso or lariat over the horse's neck, and after securing it, pass it around the pastern of the near hind foot and back

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- g 11. "Good infantry well posted cannot be dislodged by a mere frontal attack, unless the assailants are in very superior numbers, and even then success is uncertain, and only to be purchased at an enormous sacrifice. Hence, whenever possible, an attack on one or both flanks must be combined with the frontal attack."
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through the loop and draw upon it till the leg is raised well from the ground. In a little while the horse, from the constrained position of one leg and the unusual weight thrown upon the other, will sit down on his haunches and become passive. By approaching him from the front when firing, by caressing and reassuring him between shots, he will soon discover there is no cause for alarm, and when again free will cease to show restiveness under fire.

It has generally been conceded by the advocates of mounted firing that in order to secure the best results, special men, young, active horsemen and good shots, from the rural districts of the middle and border States, would have to be enlisted for the cavalry. Such men, when obtained, may be expected to make the cavalry the most formidable arm of the service. For reports show that by a few days' practice the formidableness of the cavalry, with the personnel of to-day, can be immensely increased. As all the companies of a regiment of cavalry can be brought to fire skillfully when mounted just as readily as one can, it seems probable that the usefulness of American cavalry in war can not only be soon enhanced, but its field of usefulness be greatly enlarged and its mode of employment advantageously modified. It will then no longer be requisite for cavalry to wait some special crisis in a battle to commence its attack, but go into action at any moment against any troops on open ground with the chances of success in its favor.

Cavalry, having skill in the use of the carbine and pistol when mounted, with its power of rapid movement, may justly claim that on open ground they can meet infantry on an equality, even if it be armed with the best breech-loader.

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- g 12. "Although each separate tactical unit now adopts a shallower formation than of old, the total force of infantry, whether on the offensive or on the defensive, occupies a greater depth of ground than formerly, being distributed into a greater number of lines, the distance between which is also generally greater than used to be necessary. The flanks are particularly strengthened."
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The deep rooted sentiment of those cavalymen who feel they must have a weapon ready to their hands in close combat with which to strike their enemies, can be effectually met by authorizing a return to the American method of affixing a rammer bayonet to the carbine to thrust with. All swordsmen know that the thrust is a surer and a more fatal blow than the cut, and with a rammer bayonet extending eighteen inches beyond the muzzle of the carbine, this blow can be delivered at a greater distance than with the longest sabre. The Ordnance Department has recently furnished rammer bayonets with the infantry rifle for trial. If any should be supplied with the carbine they will of course be so modified as not to permit its too deep penetration, in order that the weapon may be quickly recovered.

The best individual trials at carbine and pistol firing from the saddle show that cavalymen commencing firing at 600 yards from, and while approaching within ten yards of an enemy at a gallop and charge, can deliver in three minutes ten carbine "blows" and six pistol "blows," eighty per cent. of which will be effective upon an enemy in ranks.

Cavalry that can in charging deliver such a fire, having a second pistol for close combat, may consider themselves irresistible.

—*Circular Hdqrs. Mil. Div. Pacific, May 21, 1881.*

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- g 13. "The tactical desiderata for an ideal defensive position are: First and foremost, a clear field for fire, both to the front and flanks, for some three thousand yards; secondly, ground sloping gently downwards towards the enemy; thirdly, well secured flanks, and no prominent salient angles; fourthly, good cover for supports and reserves at a convenient distance from the fighting line; fifthly, good and sheltered communications from the rear and along the position; sixthly, good positions for batteries in rear of and on higher ground than the infantry."
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SNAP SHOOTING.

Mr. Horace Fletcher, of San Francisco, in a recent publication, explains a method of teaching snap shooting, using the rifle in practice, which, by its economy, ease, quickness, and fascination, will recommend itself to those who are desirous of becoming skillful in the use of firearms.

By this method almost any one can make himself a good snap shot in a few weeks or months, according to the amount of practice indulged in, and that, too, at a very small cost.

Having received the original idea from Dr. Carver, Mr. Fletcher has demonstrated for himself, and seen several friends demonstrate its practicability beyond a doubt.

The following is Mr. Fletcher's system:

Definition.

Snap shooting is the throwing of both the rear and front sights of a gun into line between the eye and the target and pulling the trigger, all in one motion, and is distinguished by that name from any shooting where the aim is leisurely taken, by bringing the piece to the shoulder, getting the sights in line, hunting the target and pulling the trigger when the aim is most steady.

g 14. "Supports and reserves must be kept, as a rule, in close order; whether in line or column will depend on circumstances. They should be as well up to the front as is consistent with immunity from such loss as would impair their efficiency.

15. "Good infantry need not fear the attack of cavalry even if in extended order. As a general rule they should be able to maintain the formation in which they happen to be when threatened. To do otherwise will be only to play the enemy's game."

Another Definition.

In snap shooting, the eye catches the target, and the attention is riveted on it, while the piece comes into line instinctively.

In other shooting, the attention is turned from the target to the gun and sights, and after getting them in line, is returned to the target.

The practice of snap shooting does not interfere with aiming at leisure, but aiming at leisure unfits one for snap shooting.

When the face is in danger, the hand comes before it instinctively to protect it; and in the same manner when a target appears the gun should as instinctively and quickly find its place in line between it and the eyes.

This is necessary to the perfect *snap shot*.

The place for practice should be open ground, or in front of a bulkhead, at least twenty-five feet in height, and three soft pine boards in thickness.

Rules.

The tosser should stand ten feet distant from the firer, with his side to him, and toss the bell-ball about fifteen feet high, and so that it will fall on soft ground, two or three feet in front of where he (the tosser) is standing.

The firer should disencumber his shoulders of anything that in any way interferes with their free action, by removing his coat, vest and suspenders, and stand firmly on his feet, holding

g 16. "In order to get the full value out of its present armament, infantry should be trained to firing by companies and smaller bodies at long ranges, but such firing should only be by word of command, and the utmost care must be taken to prevent waste of ammunition. Long-range firing will generally be used with more effect by troops on the defensive than on the offensive. Rapidity of fire, which is one of the chief qualities of the breech-loader, and more especially of the repeating rifle, should only be taken advantage of at close quarters, and for very short periods. Deliberate, independent firing is that most commonly used."

the rifle with the stock below his right elbow, the muzzle above the level of the eye, and his left hand grasping the barrel as far out as it can reach with ease when the rifle is brought to the shoulder in aiming.

The instant the ball is tossed, the rifle should be brought to the shoulder with as quick a motion as possible, regardless of the speed the ball seems to have.

When the ball has reached its greatest elevation, just see it full over the line of both sights and pull the trigger.

The rifle should not be allowed to get foul, but cleaned before any burned powder has accumulated in the grooves.

Practice at balls thrown straight up to a uniform height should continue till tolerable proficiency, say the average hitting of 80 per cent., has been attained, when the direction should be changed gradually to that of a curve, which lengthened out sufficiently, constitutes the cross-shot.

The drop-shot is the following of a ball, from its summit down to within one or two feet of the ground, and hitting it there.

The incoming-shot is at a ball thrown at the firer from a distance of say 50 feet from behind a butt, and is the easiest of all.

The trap-shot is the most difficult, requires the quickest action, and is consequently the very best practice, and is the hitting of balls thrown straight away from the firer by a

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- g 17. "Although the bayonet will now only come into play exceptionally, soldiers must be taught that there are still occasions for its use, and that its employment is the last argument to be brought against an enemy who will not yield to the firearm alone."
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spring-trap, or by hand, so that they fall not more than twenty-five feet distant.

Balls *only* should be used as flying targets, for the reason that a bullet may pass very near the center of an irregularly-shaped object, and not hit it, the miss conveying an erroneous impression of the aim.

Quickness of action is *most* important in snap shooting, not only in firing but in loading.

Reload your piece immediately after discharging it, and be ready to fire again. That you may accustom yourself to be quick in all your movements, try how many times you can fire, reload, and hit a bell-ball thrown up perpendicularly in a given time, say one or two minutes.

NOTE.—*100 consecutive misses at first will not indicate an inability to learn to hit. Perseverance and attention to the suggestions here given will make one a good snap shot in less time than may at first seem possible.*

Explanation.

Even in learning to shoot with a shotgun, the rifle should be the elementary arm used in practice, and be handled with success on all the shots before the shotgun is taken up.

True impressions only should be given the learner, which the rifle does, and the shotgun does not, give.

Occasionally, the scattering of shot may allow an object to drop without being hit, when the gun has been held right on it, and again, a stray shot may hit, when the aim has been high, low, or to one side, in both of which cases the impressions given the firer are erroneous.

g 18. "Although improvements in firearms seem at first sight to favor the defense at the expense of the attack, it is not so altogether, even from the material point of view, while from the moral point of view the advantage remains still as heretofore with the assailant.

19. "A mere passive defense will produce no great result. A commander when on the defensive must always be prepared to make a counter-attack at the right moment."

With the rifle this cannot occur, and every time one makes a hit he has received a true impression of the position the sights should hold relative to the bell.

[The service rifle or carbine, with round ball and reduced charge of seven grains, are the best to use in practice, for several reasons:]

1. The expense of shooting them is very light, owing to the low cost of the cartridges.

2. Because there is no perceptible recoil, which is an important consideration, inasmuch as the *flinching* which a beginner does involuntarily, if he stand behind a kicking rifle at first, is very hard to overcome; but which he avoids when he has learned to hold his gun firm against his shoulder and to brace against it.

The Fletcher bell-ball is not made to resist a heavier charge.

The Fletcher bell-ball* is a metal ball, made up of two hemispherical gongs, joined by a post of the same metal, all cast in one piece, and is about two inches in diameter.

A space between the gongs allows perfect vibration, and being all one piece it rings distinctly, no matter where hit, so that it can be heard several hundred yards.

It is practically indestructible, and can be hit thousands of times without being destroyed.

Inasmuch as the bullets are projected high in air in nearly all the shots recommended, and are quite light, when they are spent they are harmless, so that long range is not necessary;

* A bell-ball of $\frac{1}{4}$ -inch boiler iron, composed of two hemispheres united by $\frac{1}{2}$ -inch post, can probably be made by the post blacksmith.

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Ammunition, how supplied and carried in action.

“Modern small arms have, owing to their rapid fire and long range, introduced into the art of war a new factor, which has made it absolutely necessary to modify fighting tactics, and to regulate, not only the fire itself, but also the means of maintaining the intensity of that fire throughout the duration of a long engagement by some well ordered system of supply and distribution of ammunition.”

but it must be kept in mind, however, that they are projected with much force, and at two hundred or three hundred yards even, have considerable penetration, and great care should be taken in giving them direction.

A bulkhead to resist short cartridges should be, at least, three soft pine boards in thickness.

The keeping of scores during practice to show the progress made by each, is beneficial. At first an occasional hit will seem like good shooting, while later an occasional miss will seem to make a bad average, owing to the advanced ideas of the firer, but the scores will determine the true progress. There will be times when the learner will shoot easily and well, and others when he may find it very hard, but practice can develop a skill which will be able to overcome the influence of shaky nerves.

The near distance of ten feet is the best range at first, because the object is to hit as easily as possible; but later, as proficiency is acquired, the tosser may retire till ten yards is reached, which is far enough for all practical purposes.

Fifteen feet of elevation is sufficient, a higher ball being really easier to hit, because the firer is more under it.

The ball thrown perpendicularly is of course the easiest to hit, but if it fall in front of the tosser two or three feet, the firer is less liable to be disturbed.

The farther out on the barrel you can clasp your gun with your left hand, easily, the better control you will have over it.

It is this advantage that tall men have over short, that makes them frequently better field shots.

h "In several of the armies of Europe modifications have already taken place as regards musketry instruction with the view to the use of long-range musketry fire; we may therefore expect to find ourselves at a given moment in presence of an enemy capable of producing, by the intensity of his fire at long ranges, that useful effect which it is known may be derived from it in the present day, and it is therefore indispensable that we should be at all times ready to produce a superior effect, that is to say, to crush the enemy with a greater mass of projectiles than he can fire at us."

The importance of quickness of motion cannot be overestimated. There is always a tendency to follow the ball up with the rifle, but the first care should be to get the rifle to the shoulder as quickly as possible, when time to aim will be secured before the summit is reached, whereas, tardy action necessitates hurried firing.

During the second of time when the ball is at the summit, it does not seem to have any motion, and is, consequently, the best time to hit it.

Seeing the ball *full* over the sights, means in reality the allowing for a little drop before the bullet gets there.

It is the fault of nearly all beginners to uncover too much of the front sight, and consequently to overshoot. Be careful that the front sight is well down into the rear when you see the object finally, and pull.

The pulling of the trigger must be done without hesitation, but quickly as soon as the judgment orders it.

The practical value in field shooting, gained by the mere hitting of balls thrown up perpendicularly, is not great, but as a preliminary practice it is essential, and should be accomplished before other directions are given to the bell.

With practice on the cross-shot, and similar ones, comes the true benefit which is derived from this system, and which will perfect one in field shooting, not only with a shot-gun on birds, but with a rifle on running game.

The instant the bell is thrown for the cross-shot, bring the rifle to the shoulder as quickly as possible, take aim and follow

h "We are thus forcibly compelled to admit the necessity of a larger consumption of cartridges than heretofore; and hence the absolute need of assuring to the infantry a continuous and sufficient supply of ammunition to replace what has been fired away, a supply which is to that arm (as says General von Scherff) 'a condition of existence which must be fully and entirely satisfied.'"

it, firing as you go, *never* stopping the motion to pull the trigger.

The drop-shot is, perhaps, the prettiest as an exhibition, because the bell is hit just when your spectators think it has gotten away from you, and is excellent practice. Like the cross-shot, it teaches an easy sweeping motion of the rifle, which is the secret of successful snap shooting.

Catch the bell just full over your sights and keep it there while you lead it down.

The bell should not be thrown so as to fall at a greater distance than twenty-five feet, and the firer should stand right beside or just behind the trap.

Quickness of motion in getting the rifle to the shoulder becomes a habit if persisted in, and is absolutely necessary to success in this shooting.

If the learner, in beginning his practice, is sufficiently impressed with the importance of the quick first motion of getting his gun to his shoulder, the instant a mark appears he will find the chief obstacle to hitting it removed.

The trigger should not be pulled in a hurry, and never till sure aim has been taken. Quick action allows deliberate aim, while tardy action prevents it. I have repeated the lines urging quickness of action, because too much stress cannot be laid on it.

Balls only should be used as flying targets. When the beginner has attained some skill in snap shooting with a rifle, he takes justifiable pride in exhibiting it, by hitting all kind of things, such as cans, bottles, sticks, coins, pencils, and stones, but it is not well to do so.

h “On the other hand, the absolute increase of the number of cartridges to be carried by the foot soldier is limited, on account of the fatigue which this extra burden implies: our attention then should be directed toward improvement in the organization of the method of keeping up the supply to troops in the first line of combat quite as much as to the equipment of the soldier before the action.

“As a matter of fact, ammunition is judiciously expended so long as the number of rounds fired bears a suitable relation to the results which may be expected from the ballistic qualities of the arm, the distance, and the size of the object aimed at.”

It is excellent practice, when you have become proficient, to see how little time it will take you to make a given number of hits, say twenty, not counting the misses as anything.

The less number of misses you make, the less time you will require.

The tosser should observe the instant the breech block is replaced after the cartridge has been inserted, and throw immediately without waiting for instructions.

In order to establish a standard of quickness, it may be well to state that the writer has made twenty hits in one minute and sixteen seconds, and one hundred hits in seven minutes and twenty-nine seconds.

In the first instance he made no misses, but in the second there were seven misses, making one hundred and seven shots in all; an average of about four seconds to the shot.

Target Practice Compared with Snap Shooting.

The shooting at still targets, either off-hand or from a rest, judging windage and the elevation required, nice cleaning, regular loading, etc., are very scientific and good practice for sharp shooting, but unfit one for snap shooting.

To be able to judge distance, windage, the height above or depression below the level, the speed and direction the object is

h “A body of infantry which opens fire at long range will evidently have more opportunity of utilizing its fire, and will consequently burn more cartridges than a body of infantry which only fires at close range. It follows that the adoption of fire at long distances necessitates an increase in the number of cartridges to be placed at the disposal of the soldier. But this is only a minor point.”

moving, while you count one, two, three, is the skill which this system endeavors to teach, and which is solidly practical.

To stand for one or two minutes, with the elbow resting on the hip, and the hand twisted in an awkward position underneath the trigger guard waiting for a season of partial paralysis to steady the aim, for any purposes other than sharp shooting, is unpractical.

To rest, either standing or lying, is more unpractical still.

To be able, in spite of shaky nerves, to throw the rifle, bullet and all, at the object in an instant, is practicable.

A good snap shot can shoot better off-hand than from a rest, and does not close either eye, when he aims.

Keeping both eyes open comes unsought with practice, and indicates that the gun has become the servile weapon, which finds its way to its place between the eyes and the object without demanding attention, and delivers its charge direct at the bidding of the master, whose both eyes are intently watching the course of the target.

The brain and finger becomes so sympathetic that the firing is done almost without bidding.

If you are stationary and your target moves, aim ahead.

If you are in motion and your target is stationary aim behind, because your motion is given to the bullet.

If you and your target are both moving in the same direction at the same speed, near each other, aim at it, but if the distance be great, aim ahead, because your target keeps up its speed, while the momentum which you have given the bullet decreases as it travels.

The force of wind being irregular and capricious, must be judged from personal observation and experience; but remem-

h “If it be recognized that long-distance fire is a distinct advantage, we must, to be logical, regulate the supply of ammunition by the necessities of the fight, and not make the method of action of the infantry depend on a certain allowance of cartridges fixed *à priori*. As for the measures to be taken to make sure that the troops always have a sufficient quantity of ammunition, these are matters of organization, and the latter must adapt itself to the exigencies of tactics.

“If we consider that the soldier’s equipment should be logically divided into two parts, the one holding what is necessary for the combat and the other what is necessary for food and clothing, we are led to the conclusion that not a single cartridge should be in the knapsack.”

ber that, like gravity, it has more time to deflect a bullet during its second than during its first hundred yards’ flight.

The general fault in aiming, in snap shooting, is over-aiming.

Aim at an object going straight away from you, as if it were rising.

Rules to Govern Competition in Shooting at Bell or Glass Balls with a Rifle, when the Balls are Thrown up by Hand Perpendicularly.

The referee, whose decision shall be final, shall take position on a line at right angles to that between the firer and tosser, opposite the tosser, and see that no balls are thrown inside a perpendicular to that line. In case a ball be hit inside the perpendicular, it shall count neither for nor against the firer.

The firer shall shoot at twenty balls and then retire, must keep the stock of his rifle below his right elbow till the ball is thrown, must shoot at each ball he orders or lose it; is responsible for the throwing of his tosser, whom he is at liberty to choose or change at will, and also for any failure to load or cock his rifle; but is entitled to another ball if there be a mis-fire on account of a defective cartridge.

**"Be just and fear not; let all the ends
thou aims't at be thy Country's, thy God's
and Truth's."**

Ties shall be shot off on time; the contestant *hitting* the greatest number of balls in five minutes shooting as he pleases, at balls thrown according to the rules, shall be declared winner of the tie, provided, of course, that rifles of the same class be used by both parties.

The Military and Snap Shooting.

It may be offered, simply as a suggestion, that the method of practice recommended in the preceding pages, might be of service in teaching recruits to handle firearms.

Practice in hitting moving objects inspires a confidence which cannot be obtained in any other way, and the repetition of the three motions of loading, extracting, and aiming and firing, habituates the learner to a free use of the arms and a confidence in pulling the trigger.

It is most important that men be required to aim and snap the unloaded piece repeatedly as an exercise, considering the pulling of the trigger a necessary finish to the motion of aiming.

Aided by a minimum expense, light report, easily-acquired range facilities, and a most-fascinating system, might not the practice be carried to firing and hitting, which is the desired result?

This need not at all interfere with the manual, but can be practiced as an outside exercise; and the result of adopting it would be felt immediately by a company, not only in the ease and quickening of motion and the improved marksmanship, but in the increased interest it would create among the members.

The price of the Fletcher bell-ball is \$2.50

CONCLUSION.—TROOPS IN ACTION.

The information to riflemen would not be complete without they were told how, in war, to utilize the skill acquired on the rifle-range, the school where skill in the use of the fire-weapons of each arm of service is best acquired.

Rifle practice, while absolutely essential to infantry and cavalry, is also of the utmost importance to artillery; for men of that foot battery who attain greatest skill with the rifle, will, when they are mounted, make the best practice with field guns, for they will have been trained to sight, to judge distances, and to estimate wind deflection with a thoroughness which the limited amount of ammunition authorized for artillery will not permit.

“The United States have now been eighteen years without war. As twenty-five years is the longest period and seventeen years the average period during which the Government has not been so seriously engaged in hostilities as to call out the militia or volunteers to aid the regular forces, the manhood of the land must expect, in the natural course of events, to be soon again called under arms to sustain the General Government.

“No nation can yet hope to escape the occasional horrors of war. This calamity comes upon nations in periods, to each nation in its own period.

“The elements of our last great contest slowly gathered force, and for several years the Government had warning of impending danger, but with the same blindness that it shows to-day, it made no preparation therefor and suffered humiliation accordingly.

“Our next war, like the cyclone that within the past few years has, with increasing frequency, struck terror throughout

the fairest portions of our country, perhaps portending more fearful convulsions, may come without warning, spreading destruction as startling over all our land. Hence it is the duty of the military at least to leave no fact unlearned that will fit them for the great emergencies of war, which neither the wisdom of the Government nor the enlightenment of the people may be able to avert."

Skill acquired on the rifle-range will be best put in practice on the battle-field in the manner set forth by accomplished students of the art of war—and fortunate is our country in having them—who, in view of all the conditions now surrounding and governing men in action, say in conclusion of the whole matter:

Need of a National Force.

There are those who affect to believe that the necessity for the employment of soldiers in national defense is about passing away. In a few years in this country, it is alleged, the Indian as a hostile element will have disappeared, and with him, it is supposed, will go the armed force that subdues him. There is nothing in history, or in the nature of things which attend us here below, which really warrants such a conclusion. The objective application of the national force will undoubtedly be changed, nothing more. In 1859 visions of perpetual peace came to the gifted seers who controlled much of the public opinion of this country; but before the dissolution of a single Congress this country was treated to such a carnival of blood as modern history has not before witnessed. In two short years a million of men faced each other in deadly hostility, and the bodies of half a million were consigned prematurely to their mother earth within four years. So long as "wealth accumulates and men decay" there will be something worth fighting for, something not only worth protecting, but that must be protected. A few years ago, after a period of unexampled prosperity which followed the war, a kind of social cyclone of railway strikes and riots swept across this country from east to west with a most unnatural and unexpected fury. We hardly dare to confess to ourselves the success of the consequent disorder, nor of the simple

means resorted to to stay the ruin then in progress. The representatives of order, of stability, of wealth and its resulting benefits were clearly, for a few days or weeks even, fearfully alarmed, and under the discipline of fear of final consequences promised themselves to make effective provision that such outbreaks should be guarded against in the future. But nothing was done, and after a brief interval affairs settled into their old grooves, and all the wise precautions talked of were forgotten. May it be a long time before there shall come another similar shock to startle the country out of its repose. But what has been will be.

While man remains what he is, we may infer that national safety exists solely in the recognized power of competent armed self-defense. Does even the ordinary citizen who accumulates wealth find it possible to sit down in peace to enjoy his abundance outside of a vigorous system of personal defense, organized by society or government for his special protection? Not in any country now known. Even with this assistance his cares increase, his watchfulness must be sharpened; on every hand he needs bolts, bars, special police, paid private watchmen, determined and trustworthy servants, or his property will quickly take wings and flee away. Wealthy nations are but accumulations of wealthy men, and as such communities they tempt the assaults of strong and vigorous neighbors.

In our comfortable but modest homes for many years we have spoken with pity of the brigand-ridden parts of Italy, Greece, and Mexico, but as we are becoming rich and are pushing out unguardedly westward for the precious metals and their attendant belongings, we find that the chalice is placed to our own lips. Our express wagons are robbed of their treasure, and so are our passenger trains upon our railways; but we tone down the names of the plunderers in order to save our pride; we call the robbers road agents, James boys, Taylor boys, cow-boys, flibusters, etc., and endeavor to avoid the disgrace of the matter by calling these affairs local. They were local in Sicily, in the Abruzzo, Roumelia, in Greece, and possibly in Mexico. Something even at home must be done eventually to keep down such disorders, which will increase with population and the accumulation of wealth. In other countries it has required soldiers. Can it be done in our own by private means, or will it get at last beyond all such efforts? Time will tell.

Thus we can "survey mankind from China to Peru," and the lesson derived from such survey is that, unhappily perhaps for the race of mortal man, it is as a law of their progress that they must

struggle to acquire by the sweat of their brow, and fight to the last drop of their blood to keep what the hard earth has granted them.

It is not convenient nor wise to withdraw skilled workers from the great marts of trade and the workshops of a nation on every occasion that may arise to defend social security nor to protect even the soil. A just division of labor will indicate a certain percentage of the population upon whom the duty of watching while the others work should fall.

The Soldier of the Future.

In this result there will still be found a sufficient reason for the vocation of the soldier. He must, however, well and fully represent the entire community, and naturally should be selected while still young to enable him to acquire that training which it is believed the soldier of the future must really possess in order to compete with the armies of the civilized world in a struggle for existence, as sooner or later must be done in all cases. The uncivilized exert mainly a brute force, coupled with craft, stratagem, and perfidy; but against the arts of modern warlike power, as exerted on land and sea, there must be created an ideal which is almost new to the field of battle.

In the first place, consider what an implement of extermination a modern rifle is getting to be, and if we can suppose that the next twenty years will change the infantry and artillery weapons as much as have the last twenty, what have we to expect? We shall have a magazine gun, of course,—for a time certainly, and means must be taken to carry with it abundant ammunition; but ammunition will be of little use except the men who make use of the guns be trained to the greatest self-control in the management and direction of their fire. In respect to a knowledge of his arm a soldier must be an intelligent man, and as so much in such cases will rest with the individual, he must be a most trustworthy one.

Formation of Troops.

With batteries of machine guns and with magazine rifles a close formation for attack or in action can only be an exceptional one. *Ordinarily an open skirmish order must be used, with the men seeking to cover themselves in every possible way. In fact, the struggle for protected points will be constant, and the possession of one or more may decide the character of the contest. To expect untrained men to suc-*

ceed at this is to expect miracles. In the defense of positions there will be no such necessity of occupying protected ground or field-works in such great numerical strength as formerly. It would seem as if lines might be thinned out and lengthened, so that turning the flanks of an enemy could be made a very serious business for the attacking party; in fact, under ordinary circumstances, almost impracticable. When the movement can be masked by woods and hills, or concealed by fog or darkness, it may be done; but by feints and extension nearly impossible in a parallel order of battle with intelligent, alert, active foes. Intrenchments and cover of all kinds must play most important parts in future field operations.

Importance of Individuality.

It may be inferred that the soldier of the future must have, in addition to skill in the use of his arms, intelligence and aptitude in the face of an enemy's fire, and must also be an active vigorous man, *competent to use the spade or shovel skillfully and effectively*. Men of medium size, of great activity, vigor, and devotion will be in demand. To fit him for the ordeal of battle with such arms he *must study his weapon carefully, and understand it perfectly*, or it will fail him at the critical moment. He must be taught its utmost power, *and this will take time and careful training*, even by masters of the art of making soldiers.

Thus far it appears that the wars of the future must steadily increase the importance of individual efforts, and enhance that of men as individuals; much of the effective power of large masses is broken, and close order, except for purposes of drill to accustom men to compact marching and manœuvre on the field of battle, ought to be abolished.

An open order is needed, a rank entire system, possibly one behind another. If a rear rank be retained when marching and manœuvring, let it fall back far enough to march easily without any lock steps. Thus tolerably green troops may readily manœuvre, advancing and retreating in lines of ranks entire, and when moving by flanks by simply forming fours. Why not have all movements, company, battalion, brigade, or division, made in this loose order? The men must be good enough to be trusted to stay where they are posted or placed, manœuvring or in action. The calling must be honored, and the pay made sufficient to induce men of good character and condition to become ambitious to undertake the duties of the soldier. It must seem hopeless indeed to any one realizing and

foreseeing these conditions and their exactions to attempt anything effective with other than very young men. The long training for the career requires it. They may not at first endure exposure as well, nor in the field prove as hardy, but in the end they will assert their value, certainly for cavalry and infantry. It is not probable that in a country governed as this is, having no aggressive policy, but busily engaged in its own domestic affairs, a large army will be needed. But what there is of it must be good of its kind; in fact, the best possible. With an enormous population from whom to draw its choice of recruits, a perfectly trained force should be the result.

National Guards.

There is so much importance attached to names in a democratic country that we may anticipate that the internal police and the preservation of order will eventually be given over to troops termed national guards, State guards, or some force that will be evolved by the action of or out of the militia laws or system. In this method of preserving order there are great advantages and slight drawbacks. Some of the advantages are that not much application of force will be made on any one occasion, and when made it need not, and probably will not cause any permanent hostility against those engaged in the disagreeable duty. In the course of time, however, the marshaling of separate State troops may lead to coalitions between strong State governments in order to coerce others, or to secede in case of unexpected conflicts of interest, or under the temptations of great apparent advantages.

Need of a Small but Well-instructed Army.

How loud and long we boasted of the absence of soldiers and of a national debt, and other like matters, with which great and mature nations are at times afflicted, when suddenly the floods came upon us, and the country received an avalanche of soldiers and soldiering, with the resulting national debt, all at one stroke of fate. It was a sudden awakening, indeed; but this people proved equal to the occasion, and so we may be sure that they will again and again prove equal to any emergency, until old age as a nation shall overtake it, and it goes down to the grave of nations with the Chaldean, the Egyptian, Assyrian, Persian, Greek, Roman, and Byzantine empires. All had their youth, the period of growth; their prime, the period of wide influence and greatest sway in arts

and arms; and then the slow decline, except where, by a kind of popular suicide, they brought about their own destruction as an independent people suddenly like the Greeks.

As we have already pointed out, a people so fortunately situated as are the Americans, if they keep free from entangling alliances, and steer clear of the schemes that foster ambition, will scarcely find a necessity for a larger army. A military force sufficiently respectable to keep alive the military art, and to form a nucleus for the national volunteers in case of rebellion or foreign invasion, is all that is needed. Out of this force must be drawn sufficient troops to guard the public property of the nation, as its forts, arsenals, dock-yards, and reservations, and at the same time secure its large harbors from insult or seizure in unexpected emergencies.

Cavalry.

Too great attention cannot be given to the horses for cavalry; to their condition, and to remounts, and to whatever tends towards a perfected ideal cavalry service. Our cavalry, while serving on the plains of the great West, should be quartered in the best manner. All its quarters, barracks, warehouses, shops, stables, and corrals should be constructed for its use ready to hand, * * *

* * * Cavalrymen should not be put on extra duty for any purpose whatever. In its ranks should be cultivated such a spirit that the best youth of the land might be disposed to join it to seek adventurous or attractive service, regarding it as a pleasure as well as matter of soldierly pride to belong to it. In its ceremonial parades there should be kept up all the "pomp and circumstance" of a glorious military show. The idea of duty should be supreme, and that of cavalry, to be worthy of its name, must always be mounted duty. To do any other than mounted or military duty comes short of a perfect service. A cavalry thus trained would stand first in the estimation of infantry or artillery associates. It is only when cavalry is relieved from post duty, and the men lounge around void of spirit or love of legitimate mounted service, that it is felt to be unequal to what is generally claimed for it.

As it is difficult to load a weapon on horseback, repeating and magazine arms are, in the nature of things, required for cavalry. As much fewer shots take effect on horseback, more of them are needed. The moral effect on the cavalryman who uses a magazine gun ought always to be considered. The weapon which the soldier himself esteems and values most highly, as he is the one to use it,

ought to be given him; especially whenever he becomes duly instructed and competent to make good use of it. Whatever arms are furnished, however, there can be but one opinion as to the necessity of the men being trained to the highest point of efficiency in their use on foot or horseback. If a sabre be used, the men should fence constantly with one made of wood, as heavy as the regulation one, until noted for their individual skill in its use. To shoot well, at speed, from horseback with the pistol ought also to be esteemed as more than an accomplishment; it should be a duty.

— *Brigadier General Samuel B. Holabird, Quartermaster General.*

The Duties of Cavalry in War.

It is a mere truism to say that improved firearms—machine guns—have greatly modified the old conditions of war.

It may be said that in some of its very important, indeed essential services, cavalry alone remains but little affected by the extraordinary inventions in firearms. The reader shall judge; I specify the following duties, viz.:

1. Scouts and reconnoissances for discovery in campaign of the movements and strength of the enemy's army or columns.
2. Opening communications—interrupting those of the enemy.
3. Destruction of, and cutting off the enemy's resources, and lines of supply.
4. Surprises of distinct intrenched positions, depots, etc.
5. Prompt occupancy of strategic positions and points; as heights, bridges, fords; important to operations decided upon; or to thwart the enemy.
6. The guard of the army, day and night, at rest or moving, from surprises, *clearing the way* of marching columns.

These detached services are dependent chiefly upon rapidity of motion. In the late war our cavalry very successfully performed the infantry service of defending and attacking intrenchments dismounted; and the last even sometimes mounted.

In battles of importance, after hours of carnage, when ammunition may fail, when a great mistake may be committed, when confusion may occur, in short when the balance of victory is nicely poised, then the sabre should be cast into the scale! Almost any of these conditions neutralize the ascendancy of machine arms and

restore the cavalry its great powers; there should always be a reserve of cavalry to strike then!—only a portion of the enemy's army in such a state being routed, the rest will seldom stand fast—unless held by a hero.

If the enemy be routed, then woe to the conquered! the cavalry becomes of supreme importance. Drawn battles decide nothing, and victory is claimed by both sides; but the energetic, thorough pursuit of a routed, sometimes of a merely retreating army, shall give the great results—the peacemaking *fruits* of victory.

But, on the other hand, a retreat covered by superior cavalry can be made with small loss.

But to return to tactics. Tactics for infantry should be simplified—reduced in volume, with fewer and less formal deployments, with no injurious puzzles, dependent upon “right or left in front.” Nothing can be more important than precision of fire, but that, of late, has received great attention. In connection with it, exercises in open order should be developed as the great feature of future battles. Their first lines will consist of skirmishers, with equal strength in reserve and as supports; these, together, will be about half as numerous as the second line, in single rank.

After all, infantry must give substantial form and coherence to armies; it is often thrown on the simple and dogged defensive—never the case with cavalry.

So cavalry tactics must be in nearly all respects different; its movements both in detail and in the large are the movements of horses; its duties are disconnected and essentially different; its powers bear no resemblance, little comparison to those of other arms; and it has peculiar weaknesses. The character and worth of cavalry are dependent upon mobility in all its widest sense. Its deployments, few and simple, should be without halt, unless ordered—the first formations ready to strike; and if such its need, the later ones in that admirable formation of echelons. The officers, who are always in front, should be its guides; making an end to the martinet system of markers and guides, “general” and “particular,” right and left, and their mathematical lines. No confused noise of unnecessary, repeated commands—some of which the very horses anticipate—drowning often those of real importance.

What room or reason is there for precision of movements and of lines in cavalry? If there were time, the nature of horses renders them as impossible as useless.

With short enlistments, and much more with instruction at the beginning of a war, time fails for much nicety and formality in riding; security of seat, "rough riding," will much better pay.

—General P. St. George Cooke, U. S. Army.

Artillery.

Next to the infantry the artillery in future is to be the most important factor of an army in actual battle. Whatever doubt there may have been about this in the past wars, modern improvements seem to leave no ground for discussion as to this in the future. But, as in the infantry, there is necessity for very important modification and changes in the tactics of this arm. It must be used with extreme boldness. Light batteries must always be at hand to take advantage positions on the skirmish line, and, by rapid work, to aid the infantry in forcing the enemy out of strong positions. In the heat of battle it must be massed and pushed boldly within easy range of the enemy's line, ready at all times while combatting the enemy's artillery to fire upon any masses of his troops at longer ranges which he may be so unskillful as to expose. It will, as heretofore, begin and develop the battle; and, unlike in its past, it will be used by an army in retreat, with its rear guard, to punish the too confident pursuit of an over sanguine foe, and to protect the rallying of beaten troops being organized for fresh resistance. The theory that artillery cannot protect itself has been carried too far in the past, and that theory must so far be modified in the future as to prevent the paralyzing of important bodies of troops as supports to guns doing nothing or only remotely engaged in the action. The perfection in artillery in future wars must depend on the capacity and energy of battery commanders, the discipline and drill of the men, alertness and boldness of action, rapidity and judgment of its fire, and a general unison of action between it and the fighting lines, which will make it an important factor prominent even to the skirmishers in every organization where fighting is being done. Who of experience in our Civil War has not heard the supports of artillery grumble at the inactivity for them as such in a battle, and who has not observed the *esprit* of a line in fighting for its artillery when the guns in action were kept on the skirmish line by an active commander, when the men in ranks could realize how important an ally these guns were if properly handled?

Cavalry.

Experience teaches that the uses of cavalry in future warfare will, like that of the artillery, be more extended, if not different from the uses it was put to in the times of Frederick the Great and Napoleon the First. At the same time it must not be concluded that it will never again be used successfully in battle. While our Civil War demonstrated that cavalry has uses during a campaign not before known to the world, it at the same time showed that a judicious use of cavalry, even on the field of battle, either mounted or on foot, added greatly to the success of an enterprising commander.

In 1864 and 1866 the Prussian cavalry was inferior, and even in 1870 was badly managed. Its service in out-post duty and reconnoissance was good so far as it went, but the efficiency of it as an arm seems to have been neglected by the Germans in their care for the infantry and artillery. The failure of cavalry to accomplish much on either side in the two great modern wars of Europe has misled the uninformed, and many well-informed officers, who have paid more attention to other matters, have been led into the error of believing that cavalry could not in future be used successfully in battle.

A glance at the history of this arm during the Middle Ages as compared with the present time will convince the careful student as to its future.

There are two important considerations for the success of cavalry apart from those that cover its efficiency in drill, discipline, and organization; and these are, first, that the officer chief in command of an army shall permit or direct its employment in large masses, untrammelled by detailed orders; and, second, that it shall have competent chiefs who have confidence in its power, and who will lead it into action at such times and at such places as it will do the most good. Caution, discretion, and good judgment must be paramount in its chief until an attack is decided on, and then, throwing these to the winds, he and everybody with him must charge home determined to succeed.

In our own country the Indian of the plains is a perfect light horseman. His method of warfare, like that of the Turks and Mamelukes, is almost always individual, rather than concerted and organized, as among civilized nations. His strength is in his capacity as a horseman and in his powers as a marksman. He is quick in his movements, wily as a foe, depending on his own skill as

a skirmisher rather than on directions or commands from a superior. They move in groups with the rapidity of the wind, finding the weak points and concentrating in numbers at all vantage positions as if by instinct, and disperse again if confronted by numbers, only to repeat the attack at new weak points. They use firearms with great accuracy while mounted, even in rapid motion. Add to this that their horses are trained as well as the riders themselves, that they halt and stand steady on an indication from their riders, that they stand still without holding when their riders dismount to fight on foot, that they are even in their gaits, quick in their movements, enduring and sure-footed in the roughest country, and we have a character of light horsemen that future armies might be happy in possessing.

The cavalry of the future may be all that cavalry has been in the past under the same conditions. It must have array commanders who will organize it, and leaders who will conduct it to victory. The timidity now existing as to the bullets of the rapid shooting small arms will be overcome by some new Charles, as was that greater timidity with reference to the newly discovered gun-powder and newly invented small arms of the early modern ages. The single rank formation of modern cavalry supplemented by clouds of skirmishers to envelope an army attacking it in flanks and rear when it is disorganized, either by defeat or victory, will solve the question for all time to come of the usefulness of cavalry under the new conditions of warfare.

—*Col. Westley Merritt, 5th Cavalry, Brevet Maj. Gen.,*

Cavalry are now armed with a carbine efficacious at 2,000 yards, and with a revolver killing at 300 yards, which may be loaded and fired eighteen times (three rounds) in two minutes, beginning with empty chambers. "Sheridan and other leaders in our civil war threw aside the traditions of European cavalry, jingling brilliant and costly, a massing and charging force," and made our cavalry an offensive and self-defending power against all arms. In the position in warfare which it then assumed, as well as in the new future opened to it, the present armament of carbine and pistol will contribute powerfully to maintain its relative importance, as it will be more frequently called upon to rapidly move at a critical moment, and fight as infantry.

Shelter Trenches and Intrenching Tools.

In one form or another, the idea of field intrenching is a very old one; but the rapid development of modern fire has given to the subject an importance it never before possessed. It was thoroughly appreciated, and never more effectively practiced, often with the simplest or improvised implements, than by the soldiers of our civil war.

"They waited neither for orders, deployment of skirmishers, or formation of lines, the rule being that troops proceeded to this work without orders; the result was that the American soldier became an adept in intrenching himself." Experience demonstrates the great value of field intrenching, even when extemporized and constructed in the presence of the enemy.

Intrenching is now part of the work of fighting, and the intrench-tool is indispensable in the field equipment. Hasty ideas that the bayonet had become a weapon of questionable utility, joined to the fear that it would be rash to abandon it, have created the device of bayonet and intrenching tool united in the same implement. But a spade cannot be made a bayonet and a bayonet is useless as a spade; and more mature considerations, looking to a serviceable intrenching tool, and that a certain number should be carried with every infantry and every cavalry company, always ready for use, are by far the wisest, and have generally been adopted. Neither the best form of intrenching tool, nor the best mode of transporting it, is yet settled upon.

Experience has proved, that men individually provided with a small intrenching tool, easily carried, and serving at the same time as a cleaver, will provide shelter trenches of the simplest order for themselves in fifteen minutes; and with picks and shovels (which may be carried in wagons) in thirty minutes. The positive gain in the subject of intrenching, has been in the official recognition of the necessity for organization of effort; and in the prescribed means for that effort; in the instruction of the soldier, in the method of intrenching, and in the principles to be observed in tracing lines. The essential points settled, are, that trenches must resist rifle bullets; afford cover to the soldier in firing positions; be easy of execution; and be no obstacle to offensive movements.

The Americans were the first to develop the power of shelter trenches, but since their great war the subject has been carefully considered in every service; and questions of tool-carrying, and the best means of construction of trenches will be speedily settled.

Cavalry.

Should infantry ammunition become exhausted, or a fog, or blinding storm prevail, there will be the cavalry opportunity;—similar to that of the wet ammunition of the French at Eylau, and of the Austrians at Dresden. Cavalry united with horse artillery is as terrible as ever in pursuit; in destroying convoys; and in delaying or breaking up marches. If employed massed now, it would be for wide detours to cut communications, destroy railroads, cut off supplies; or to reach the rear or flank of an enemy, or a weak part of his line. Grand charges to carry batteries, or to force lines against unshaken troops, as those of the French at Jena, and Waterloo, should no longer be made, for cavalry so acting, can no longer expect to escape destruction. In this much, cavalry has lost as an instrument of battle; but in view of the greater mobility of armies, and of more rapid results in war, the strain upon cavalry will be far greater than before.

To shelter large masses of cavalry, as a corps or division, from fire on the field, would now generally be to place it so far to the rear that its services could not be had at the supreme moment of opportunity, or necessity. On the other hand, if the country be broken and the mass may be sheltered nearer, such country is unfavorable for the action of cavalry in large bodies. Small bodies therefore, of cavalry, apportioned to a division of infantry, would be better sheltered nearer to the lines, and always be available for any service, acting either separately or grouped into larger units. For these reasons and the fact that large masses of cavalry cannot manœuvre in front of the enemy's line; and that they can rarely be used without murderous loss; cavalry should not be organized into divisions and corps.

A better arrangement is, that each infantry division should have a brigade of cavalry; and also each corps; then, in exigency, corps and division cavalry may be united.

When at last there is a conspicuous necessity for the shock tactics of the charge, it should be in the formation of greatest shock with least loss. Too much solidity will cause great loss and forbid individual action. It is pretty well settled, and for many reasons that the advance to the charge against artillery or infantry, should now be squadrons in echelon formation.

The dispersed order of squadrons in echelon is the formation best for the charge. By dispersion is not meant loss of formation or disorder. To preserve unity of effort, the best writers recom-

mend the grouping of men for command, under non-commissioned officers, and for regulating the men in dispersed order. "Grouping does not remove the command from the commanding officer, and it is the best for rallying. This is applicable equally to troop, squadron, or regiment. Drill must impress the intervals, preserve order, and enforce habits."

The breech-loader enables troops to safely assume the open order, since its aimed fire is five times faster, and five times as effective as that of the muzzle-loader. Hence one man is now in all respects the equal or superior of four formerly, in the power of fire, and may therefore take the space of four.

Artillery.

"It will be observed that the immense increase in the proportion of artillery required and brought on to the field at the beginning of an engagement is a notable feature of modern change in warfare. And the assailant who fails in the prefatory battle of artillery has small chance of gaining the day."

Tactics.

As the single rank is the easiest of extension, it should be the habitual formation of the first line of battle, which, it will be remembered, we have designated as including the shooting line, the supports, and the main body.

Especially should our infantry tactics be altered to conform to the condition of modern fire, and altered formations for battle. At present they admit of changes from single to double rank, by but one flank; skirmishing order can be taken only from a solid front of four men; and the prescribed methods of skirmishing are wholly unsuited to the modern shooting and supporting lines. Now, the fighting line of the battle is the skirmishing line; while *our* tactics contemplate that the skirmish line should cover the attack of fighting lines in rear.

Front and rear rank distinctions may now be laid aside as no longer advantageous or even useful. The division of a company into platoons, and of platoons into sections, and if requisite, these last into half sections,—the division in all cases being where most convenient,—may profitably replace orders of fours, for drill and practice, as well as for battle. Such divisions are always arbitrary, and independent of numbers, therefore losses in battle will not dis-

turb them, since exact uniformity is not essential, as in order of fours. No system of tactics should parcel out a company into exact units of command; otherwise, the loss of officers, or non-commissioned officers, disturbs the whole control, and for every fatal shot the command must be rearranged; otherwise the symmetry and the system must be abandoned. Modern tactics should be as simple as possible, consistent with great mobility; and ours would gain much by the exclusion of movements no longer useful.

Napoleon said that a nation should change its tactics every ten years. They certainly should be modified to suit the development of the power of arms, and as often as necessary. They are now greatly encumbered by movements for massing belonging to shock tactics, and by flank movements along an enemy's front.

Troops on the Battle-field.

Manœuvring under fire has now become very hazardous if not impossible. Troops engaged can now do little more than advance and retire. Formations and lateral movements are to be avoided. Plainly, long advances in line or column under fire, are out of the question, and lines of battle must be formed at greater distances. Equally impossible are movements by the flank in the presence of the enemy, of the nature of those of Frederick, at the battles of Leuthen and Kolin. In encompassing lines of attack crotchets formed by the defensive line would not protect it from reverse fire. With a superior force, and a vigorous attack on the enemy's front, the advantages of an attack on the extremities of his line are greatly increased with modern arms. Greater precautions than formerly are now necessary to be taken in pushing troops into hazardous positions, that they be strongly supported. Movements of attack must be avoided, which depend for success upon withdrawal of troops under fire from the enemy's front. Troops in retreat now suffer far more than before,—conspicuously cavalry.

The Attack.

Difficulties of attack will more frequently compel the movements of troops at night into positions near the enemy's lines, if not of night attacks, particularly in the case of intrenched lines. In such cases the power of the defense will be greatly weakened if the assailants reach the enemy in good form. The moon-light attack on Kars is an illustration of this. The Turks, with a small force,

losing only ten per cent. in its capture; while the Russians, supported by one hundred guns, in vain attempted to retake it on the succeeding day. -

The Defence.

The defence must guard against greater liability to flank attacks; and as the increased power of the breech-loader enables a small body of men to hold longer a strong position, strong parts of his line may be depleted somewhat to strengthen weaker points, provided that it forms a chord to the enemy's arc of attack.

Individuality in War.

The difficulties of command are greater with breech-loaders. Fighting is more individualized, from the lowest to the highest unit of command. More is left to the judgment of the commanding officer of each, from the company to the corps commander, and more is required of each. The fate of battles depends more on the courage and capacity of individuals, and the difficulty is greater of holding men in hand and maintaining a close directing power. The general may order the attack, but the careful disposition of troops to the ground, and their forcible use to a common purpose, must be left to company, to field, and to subordinate general officers. Upon skill in handling units of command, will depend, far more than ever, success. A want of knowledge, or of determination, at a critical moment may cost many lives and bring irretrievable disaster. Obviously for the successful execution of his new part the officer requires the most thoughtful preparation. The field telegraph may do much to enable the general to unite in one direction the various energies of, and to supplement the varying necessities of a long battle front. To this end it is an indispensable aid, but it can never equal personal supervision, and therefore far more must be left to division and to corps commanders. In short, the essence of the modern system is to develop individuality, and to make officers and men thinkers as well as fighters.

—*Lieutenant Colonel Harry M. Lazelle, 23d Infantry.*

The infrequency of our wars, as judged by the past, is ample warrant for our present system. This does not, however, justify the very serious defect of the recruiting system of the late war,

which consisted in raising new regiments of raw recruits and inexperienced officers instead of filling up the old regiments.

The Fighting of Armies in Battle, or Tactics.

The manner of fighting between large bodies of men depends, above all things, upon the weapons with which they fight. Every change in the character of these weapons necessitates a corresponding change in the formations of the masses of men who use them, consequently the history of tactics is the history of incessant change. In Napoleon's words: "Tactics must be changed every ten years."

It would appear then—even neglecting the advantages of the flat trajectory of the present musket—that the fighting capacity of infantry (measured by its power of destruction) has increased twelve-fold within the last twenty years. Without, however, attaching too much importance to the exact numerical ratio, it is evident that the fighting power of infantry has greatly increased within the period named; a change in the manner of fighting has been the natural result.

Before examining the nature of this change it is well to note the fact that battles nowadays, with all the improvements in firearms, are no more destructive of life than they were a century and a half ago. This is very clearly established by the table in the Appendix (Note 16) showing the losses in the principal battles from the time of Frederick to the present. The destruction is now more rapid—5,000 men may be killed and wounded in ten minutes—and the duration of severe fighting is less, but the total losses are no greater. The bloodiest battles on record are found in the wars of Napoleon. There seems to be a limit to the endurance of human nerves, and when a certain percentage of men have been destroyed, one side or the other will give way and the battle will cease. On the other hand, it cannot be denied that the danger of sudden destruction to an army in battle is now far greater than it used to be, that a mistake or a false step is more likely to lead to fatal consequences, and that troops under fire must be handled with more skill, particularly among company commanders, and must themselves have more intelligence than was necessary before the days of the breechloader.

Infantry.

In all warfare, since the disappearance of the feudal system of the Middle Ages, the brunt of battle has been borne by the infantry.

Cavalry, artillery, and engineers are used to prepare, assist, or follow up the action of the infantry, but the latter has done the hard fighting, and in general decided the battle. The manner of employing it in the wars of Napoleon is very fully described by Jomini. Its employment, on the offensive, was based upon the principle of a skirmish line to open the battle, and then retire or protect the flanks, and a line of columns to overwhelm the enemy by its momentum. The principle was, in short, that of "shock tactics." The great wars of the last twenty years have completely overthrown this principle; since the firearm is now of such a character that a column can not live under it, and its momentum is destroyed long before it can reach the enemy. The tactics of the present day are therefore essentially "fire tactics," and the problems of battle are how, on the one hand, to deliver the most deadly fire, and, on the other, how to advance through such a fire. The first is accomplished by throwing up temporary fortifications to cover the infantry on the best position available; and the second by manœuvring against the flanks of these positions so as to compel the defenders to come out and fight in the open, or by advancing against them in successive waves of thin deployed lines. *From being a mere accessory in the battle, skirmishers have now become the real body of the attack.* The formation of these thin lines of attack has been developed upon different principles in this country and in Europe, which will be subsequently referred to.

Two factors, nearly equal in importance, have brought about the change in the details of battle; these are, first, the constant use of temporary fortifications, and, second, the invention of breech-loading muskets. The first of these reached its full development during the civil war; the second is of subsequent date.

It may be stated as a fact beyond dispute, *that a simple frontal assault, unaccompanied by diversions upon other parts of the field, and unprepared by the use of artillery in large masses, cannot succeed.*

Formation on the Battle-field.

To examine the actual formation of troops best suited to attempt an assault against a fortified position defended by breechloaders is pre-eminently the question of modern battles. As previously stated, two essentially different principles have governed the development of tactics to meet this problem, in this country and in Europe. In no American war have large or deep columns ever been used in battle; the formation has always been in line. Upton's deploy-

ment of skirmishers by numbers is the natural outgrowth of this traditional tendency. In Europe the great battles of the early part of this century were all fought by heavy columns, on the principle of "shock tactics;" from this, when a firearm appeared before which no column could stand, the transition to open order fighting was naturally accomplished by small columns, each throwing out a narrow line of skirmishers in its front. This is the formation of "company columns," originally devised by Prussia and since copied by all Europe. In this country the tactical unit has always been the regiment of one battalion, numbering 1,000 men, and divided into ten companies. In Europe the tactical unit is the battalion of 1,000 men, but three (latterly four) battalions are united into one regiment, and the battalion consists of only four companies.

From the experience of these wars it is evident that intrenchments must be assaulted in open or dispersed order. By this it is not meant that the troops shall be scattered about without cohesion and subject to no control, but that there shall be a prescribed formation in which they shall be most thoroughly instructed, the object of which is to bring them under fire as skirmishers at small intervals, and not in compact masses; this line of skirmishers to be constantly and incessantly fed from supports in its rear as it gradually makes its way forward from point to point, by the aid of its fire and not by its momentum or moral effect; and finally, if the enemy does not yield, this line of skirmishers to be strengthened to about the solidity of a close line of two ranks, still with supports behind it. And with this to make a final rush on the defender's works and try conclusions hand-to-hand if he still does not yield. The whole principle of fighting, in the present stage of firearms and intrenchments, must be based upon this idea of a thin line constantly fed and constantly growing stronger and stronger.

The most convenient and compact formation in which to handle troops on the battle-field out of range of fire is universally acknowledged to be the battalion column by divisions, or doubled on the centre. All systems of tactics contain this formation. The problem is how most efficiently to develop and feed the lines of skirmishers from this formation. In our present tactics it can only be done by deploying into line of two ranks, and then into skirmishers either by the numbers (Upton's Tactics, par. 358) or by companies (par. 332). The latter spreads the battalion over a front of 1,600 yards, and the Colonel loses all control over it. The former does

not extend the front of the battalion, but it has the defect of keeping the supports in one body instead of distributing them in small fractions along the line.

It must be observed that the principle of fighting by a thin line constantly fed and strengthened from the rear inevitably entails the mixing of men of different commands towards the close of the action. If the shirmish line is developed over a narrow front by a single battalion then the men of different companies get mixed together; if a single battalion covers a front equal to its own length in line (as in the deployment by numbers) then a second and a third battalion must reinforce it over the same ground, and the men of different battalions are mixed up. There is no possible way to avoid one or the other of these elements of confusion, and in the choice of evils it would appear that the former is the less.

The practical result in actual battle of this open order fighting is that men fight in small groups, the whole keeping an approximate alignment, but each group running forward from one bit of shelter to another, stopping to fire and regain their breath, and then running forward again—keeping a sharp eye all the time to see if somebody is coming on behind them. For these groups the unit of four (or eight), which forms the basis of our present tactics, has many advantages; but it is evident that the method of deploying skirmishers from a line of two ranks—the only practicable method prescribed in the tactics—is unwieldly, because it spreads the whole battalion over too great a space. A method of deployment directly forward from smaller columns appears to be necessary.

It would appear, however, that with a ten-company battalion we could derive all the advantages of the European tactics by adopting a “company column” formation, as follows (Note 22): The battalion in company columns would be formed with the fifth and sixth companies in line in the centre, with the fourth and seventh companies in their rear, at half distance; the third and second companies in similar formation at company interval on the right, and the eighth and ninth at the same interval on their left; the first and tenth companies each in line opposite the intervals. The battalion in this formation would correspond very closely to the German line of company columns, shown in Note 20. It would cover a front of 200 yards, and its fighting would be confined to that front.

Coming on the field in double-column the battalion could be deployed into line of company columns by the rear companies advancing to the right and left. The flank companies would then advance

through the intervals and form the first skirmish line covering the battalion front, followed at, say, 200 paces by the two columns on the flanks forming the first line of supports; and in the rear of these, at, say, 300 paces, the four companies in the centre, forming the second line of supports. The senior captain commanding each column of two companies should deploy his column into a skirmish line whenever in his judgment the fire becomes hot enough to require it. At the close of the action, the battalion, minus its losses in killed, wounded, and shirkers, would come upon the enemy's works in a confused mass of, say, 700 men (supposing it started with 1,000), occupying a front of 200 yards, *i. e.*, a formation about as compact as a two-rank line. This manner of engaging a line throws great responsibility upon the senior captains. This is inevitable, for all recent experience shows that the result of a battle, under fire of breechloaders, depends, in a very large measure, upon the skill of the commanders of small units.

The infantry arm at present is the breechloader, firing easily (in actual battle) about six shots a minute. Every nation, however, is experimenting with magazine guns, which, under carefully prepared arrangements, fire thirty shots a minute, and on the excitement of battle would perhaps average fifteen a minute. At the critical moment of the attack such guns may render great service, and they will make the attack more than ever difficult; but it is not certain that they will render it impossible, and they will not change in any way the principles upon which it must be conducted.

Ammunition.

The expenditure of ammunition for such arms may often be very great for a short time, and it is not safe to go into battle with less than 100 rounds on the person and 100 more close at hand, preferably on pack-horses. In spite of the necessity of thus providing against emergencies, the average expenditure of ammunition is very small.

Intrenching Tool.

The great extent to which fortifications are employed on the field of battle renders an entrenching tool a necessary part of the infantry soldier's equipment. Various attempts have been made to combine this tool with the bayonet, but they have not been successful. Nothing will take the place of the spade, and it must be carried on the person, for if it is carried in wagons it is never at hand when most wanted. The great losses suffered by Skobelev's men at

Plevna, for lack of intrenching tools, induced his men to carry a common long-handled spade on their shoulders from Plevna to Constantinople. This was extremely heavy and awkward, but it was very serviceable. It is doubtful, however, if ordinary troops can endure long marches with this extra weight, and a lighter, though less efficient, tool is needed. Such a spade has been designed by a German named Linneman, and it has been adopted by nearly every European army; the blade is six by eight inches, and the handle is twelve inches long. It weighs about four pounds, and is worn along in a pouch suspended from the waist belt. As already stated, this spade will hereafter be a necessary part of the infantryman's equipment—as indispensable as his musket and cartridge-box.

Cavalry.

It may be said that the employment of cavalry on the battlefield in presence of breechloaders is still an open question. Its use will involve losses amounting almost to destruction, but at certain critical moments, against infantry which does not fully realize the power of its new musket, it may accomplish great results.

But the great role of cavalry nowadays is not in battle. Unlike artillery and infantry, which accomplish nothing positive except when fighting, cavalry is most useful in the intervals between battles. It is the eyes and ears of an army, or, as has often been said, it is the *antennae*, or feelers, of the great military insect; always keeping the touch of its antagonist falling back before him, advancing after him, always in sight of him, concealing from him the body of the insect as it crawls along. This function cavalry has performed from time immemorial, but never before to the same extent as in our civil war and in 1870. In 1866 and in 1877 it was less efficiently performed.

Two other uses of cavalry, fully equal in importance to that of feeling the enemy, found their origin and their full development in our Civil War. These were, first, the employment of large bodies of troopers in independent "raids," sweeping entirely around the enemy's army and destroying his communications and supplies; and second, their employment as mounted infantry, fighting on foot in battle, then mounting their horses in pursuit.

Artillery.

Artillery does not now play the principal part in the defensive; its greatest use is on the offensive, and, especially, to prepare the attack; and its action can only be fully developed by concentration in great masses. Its former employment against columns of attack has now no existence, because attacks are no longer made in columns, but in open order; dispersed lines afford a very poor target for artillery, and its action against them (with shells) is insignificant compared with the effect produced by a hail of bullets. Artillery, therefore, now acts, first, on the offensive, to prepare the attack by inflicting material damage upon, and shaking the *morale* of troops occupying a strong position for defence. For this purpose it should advance as far to the front as is possible without sacrificing its horses, and should take part in the beginning of the battle. Second, on the defensive, by endeavoring to silence the enemy's batteries and prevent them from aiding in an attack. Little or none of it should be kept in reserve, for it is all needed at the opening of the battle.

The Civil War is not fruitful of lessons in regard to the use of artillery. This is largely accounted for by the topographical nature of the battlefields, which, in general, was not favorable to its employment. It was constantly used "to shell the enemy out of the woods," but it does not appear to have had a decisive influence upon any single battle.

Conclusion.

The last twenty years have seen changes in the art of war far surpassing in importance the changes wrought in an equal space of time at any previous period of the world's history.

The most important of them may be briefly summarized as follows:

1. Changes in organization, by which only a portion of the army is kept in the ranks in time of peace, and by which large bodies can be placed in the field with extraordinary celerity on the outbreak of war.

2. The uses of steam and electricity, by which troops can be transported with marvellous rapidity, and combined operations carried on successfully over a large territory.

3. The universal use of intrenchments on the battlefield, and the great improvements in firearms, from which have resulted,

(a) The necessity of attacking by infantry in dispersed order by means of its fire, instead of in column by means of its momentum or shock;

(b) The danger of destruction to cavalry if used on the battlefield against infantry;

(c) The necessity of using artillery in large masses in the early part of the action and with a projectile which breaks into a vast number of pieces, so as to do damage over a large space.

4. The use of cavalry as mounted infantry, fighting on foot and moving on horseback, in independent expeditions against an enemy's communications.

The effect of these improvements upon future operations can hardly be stated in a word; but generally speaking it will be to enable a great commander to accomplish in a month what formerly required a year, and to make still wider the gulf between a great commander and an incompetent one, for any improvement in the tools of a trade inures to the benefit of the most skillful workman.

War is, above all things, an art, employing science in all its branches and its servant, but depending first and chiefly upon the skill of the artisan. It has its own rules, but not one of them is rigid and invariable. As new implements are devised new methods result in its mechanical execution; but over and above all its mechanical appliances it rests upon the complex factors of human nature, which cannot be reduced to formulas and rules. The proper use of these thinking and animate parts of the great machine can be divined only by the genius and instinct of the commanders. No books can teach this, and no rules define it.

—*First Lieutenant Francis V. Greene, Corps of Engineers.*

Use and Deployment of Infantry on the Battle-field.

Infantry, however, being the mainstay of armies, the cases are few in which its interest is not chiefly considered, and no doubt the rifle and bayonet will continue to play the principal part in future as well as in present warfare. Well-drilled, properly led infantry can indeed go anywhere and do anything, and toward the close of the war of 1870-71 we know how, in the form of "the skirmisher-swarm," the Prussian hosts overwhelmed their less numerous and skillful antagonists on every occasion.

Cavalry can no longer ride it down with impunity. Artillery dare not approach within its deadliest scope unless the battery determines to court destruction, and at the greater distances, up to 900 yards, there are not many battle fields where cover may not enable a few groups of cool and skillful riflemen to contend on good terms with either cavalry or artillery, if not to bid them defiance, for a well-drilled marksman aiming calmly ought "to hit a foe at the rate of ten rounds a minute." An entire company of riflemen so disposed, if struck here and there by four round shot, lose only four men, whereas a gun-detachment would be disabled almost fatally.

Charges with the bayonet are fast becoming impossible, and most probably the far-famed weapon will be relegated to its scabbard except on suitable occasions, as when it may be required in hand-to-hand conflicts to carry assaults, or when camp surprises are attempted under the veil of the night.

As proved in the late European war, infantry will be more than ever employed in skirmishing order, which, after all, is the most natural formation they could adopt to insure mobility. It was only the stiffness and pedantry of the old school that kept them in close columns until the breech-loader severed the natty point and forced them to deploy.

It is also laid down that the fighting power of the first line must be exhausted before the second line is brought forward, and even then the former, or skirmishing battalion, must be reinforced on either flank generally, and, as a matter of course, the one hardest pressed, so as to avoid as far as possible the intermingling of regiments. Under the fire of artillery it is enjoined to form on the narrowest front when subjected to case and shrapnel, while a minimum depth must be assumed under shell-fire, and those evolutions are to be practiced which are best calculated to develop the utmost effect of infantry fire, while at the same time to be ever watchful of taking instant advantage of the demoralization they cause in the enemy's ranks.

Now, as formerly, it is necessary to force the enemy to fall back, only, as has been pithily remarked, the method of compulsion is changed.

"The fire of the defense *must be turned* or overpowered before an assault can be pushed home. The conduct of an infantry attack in the present day has become in principle the same as that of a regular siege. The converging fire of the assailant must be pushed up

under cover obtained in one way or another, and concentrated on some one point of the enemy's position till that of the defense collapse; then the breach must be instantly occupied and secured."

The conditions of offensive tactics are, in fine, to attack with skirmishers, *continuously reinforced by the successive interposition of the supports*, reserves, and finally of the second line; in loose order it may be, but ever and always under the complete and absolute control of their officers—from the general downward. The objective point has to be reached under a concentrated and overwhelming fire of artillery when it can be brought to bear, of small-arms when these alone are available; and then at the critical moment, no matter at what period of the fight, the final rush is made on the devoted foe and carried by the mere impulse of the assailants.

One point cannot be too frequently remarked in considering the Prussian infantry tactics, which is, that the principle of reinforcing on a flank has another object besides the avoidance of confusion, namely, *to gain the enemy's flank*. A front attack is now merely a feint; for a position properly held by breech-loaders is practically unassailable in front. The whole spirit of the Prussian regulations lies in two modes of action: 1st. On the offensive—to use a small body in front and to keep the reserves in hand for turning movements; 2d. On the defensive—to send supports to the threatened flank, the front being safe from harm.

Students of military history cannot fail to have observed the keen competition between arms and tactics which set in with the introduction of breech-loading musket or rifled cannon—a contest of skill in practice and theory which has since been carried on with such varying success as to make the victory of either seem impossible of attainment. This synthetic emulation is still rampant, and looking back at the events of the past quarter of a century, nations will be found absolutely courting war for the sheer sake of exhibiting their prowess, not indeed in soldier-like resources nor even in the justice of their cause, but in the excellence of a rapid-firing rifle or in some cunningly devised scheme of tactical retribution.

The effective sphere of infantry fire has been variously estimated as lying between 400 and 1,000 yards, but when we consider the many deterrents to good shooting, such as a moving object, smoke, fatigue, excitement, and attention to orders, the majority will be of opinion that 600 yards, at the utmost, is the reliable zone of accurate infantry fire-action.

—*Ordinance Note No. 20.*

MODERN FIELD ARTILLERY.

A Chief or Inspector General of Artillery.

The artillery of all armies, and of our's more than any that I know about, should have a HEAD, no matter by what name he is called.

So important is this, that all questions of artillery organization and administration are insignificant when compared with it. There can be no substantial improvement in the science of artillery or in its success on the battle field unless there is an intelligent, enthusiastic, and systematic supervision of the personnel and material of the arm at all times. The position is paramount to any other in any army, and each year of development in the practice and science of artillery but adds to its absolute necessity.

A Light Artillery School.

The "instruction batteries" of Italy, Germany, and Russia have their counterpart in our light batteries, but still they are not altogether alike (as will be seen by referring to the account already given, and by examining the rôle of our batteries). The facilities enjoyed by European artillery in the large number of mounted batteries assembled together render anything like a light artillery school for purposes of general instruction necessary, and, therefore, as the foreign *instruction batteries* are formed, their object is special and limited. Thus in Italy they are maintained for the purpose of instructing non-commissioned officers, and in Germany and Russia as batteries *modèle*. The duties of field-artillery in brigades and larger commands, and the elaboration of the principles of command, administration, and grand tactics, are taught at the special artillery schools in the regiments, where the batteries are grouped so as to make this possible.

In our army these branches of instruction are very much neglected, because we have no facilities, and it is remarkable that subjects of so much importance should receive so little attention. We shall require a most intelligent and thoroughly instructed class of soldiers for the service of the light artillery of the next war.

It will require great judgment, coolness, and skill to manage batteries under the terrible fire to which they will be exposed, and to make their co-operation with other troops what it should be. Mistakes, if not fatal, will be very hazardous, and no safeguard will prove so valuable as experience.*

It was, no doubt, to provide this experience that a light artillery school was established by General Sherman at Fort Riley in 1869. It consisted of one field-officer and five mounted batteries.

For reasons which are not generally understood this command was discontinued in 1871, and the batteries ordered to the different regimental headquarters. Opinions have differed on this subject, but it is believed that the majority of the artillery officers are united in favor of a light artillery school, and feel that it should be put in operation at once. Probably such a school would attain its maximum of usefulness and efficiency were it established at some point where there would be the least liability to detached service, or to interruptions to out-of-door exercises on account of the weather. The course of instruction at the light artillery school ought to cover the organization, material, tactics, and employment of all foreign field artillery, the anatomy and physiology and pathology of the horse, his shoeing, breaking, and training, the subject of harness, draught, etc. This, with suitable marches, drills, target practice, reconnoissances, and the study of the employment of artillery in battles would make the course a very profitable one, and necessitate constant application and hard study, which is what we need. A light artillery school is necessary for the same reason that we require a foot artillery school, because the batteries of artillery are so small and so scattered, and the exigencies of the service in garrison so great that our officers and men have no experience in managing more than a single battery, and are unable to carry out the instruction and promote the investigations so easily attained in a larger command.

Nothing is more important to our officers and men than the service of several light batteries together, and at such a school as is here proposed every question of command, service, and administration, both in peace and as suited to a state of war, would find their proper solution. In fact, here would be established the *model*

* During the battles of August 14, 16, and 18, 1870, the German artillery lost 128 officers, 1,889 enlisted men, and 2,602 horses killed and wounded. The batteries expended 54,333 rounds of ammunition. "Those of the Eighth Army Corps, engaged to the east of Gravelotte, in some instances lost all of their officers, three-fourths of the men, and more than their complement of horses."

artillery division of the future, every detail of which would be worked out, so that when called on to take the field our officers would enter on their duties with the alacrity and confidence which nothing but experience and training can give.

Tactics, Field Organization, and Equipments.

The tactics of the artillery have been very much simplified and improved during the past ten years, still they will bear further alteration and a rearrangement, with a view to more practical instruction. This cannot be done if *assimilation* to the other arms is to be paramount to the requirements of the artillery service, or, if it is permitted to influence at all the settlement of tactical questions. It has already proved injurious to artillery tactics by introducing principles and tactical designations which pertain to foot troops. We call a piece, with its men and horses, a section; two pieces a platoon; and several batteries a battalion. When we speak of a battalion of artillery, no one knows whether we mean two or more batteries mounted or on foot, for the expression may refer to either. It would seem that on the ground of assimilation a battery should be called a *battalion* or *squadron*, and several batteries a *regiment* or *brigade*. It is not easy to see how this change of names adds to the resemblance between the three arms. It is quite common to mistake the name of a thing for the thing itself, and thus fall into error. What we now call a platoon or battalion of field artillery resembles a platoon or battalion of infantry or cavalry in about the same way that the head of a man resembles the head of a nail, or the head of a stream or ravine, or the head of any inorganic and dissimilar object. The fact is, there is no resemblance between the *things* themselves, but between their *relation*, and this resemblance cannot be changed by using a common name. On the other hand, it seems as vain to change our military phraseology from that of the world as it would be to change our legal terms, or those used in mathematics, or medicine, or astronomy. If assimilation is to be paramount then names and principles must both go. But is assimilation worthy the place we have given it? It is admitted that in the development of a science the adopted nomenclature is, in a measure, arbitrary, but a certain degree of clearness is indispensable. No matter what the classification of persons and things may be, to distinguish *differences* we must employ different names. In tactics we should not employ a common name to describe units which are unlike, or if we do, it should be either on the ground of

their tactical equivalency, their numerical strength, or their object. Neither the infantry nor cavalry have the section, which, in field artillery, consists of a piece horsed with its caisson, together with from sixteen to eighteen men for their service. The tactical equivalent of a single piece at the present day, in determining the proportion of artillery to the other arms, is from two hundred and fifty to three hundred men, or a little over a modern company. The tactical equivalent of a platoon of artillery is five or six hundred, and of a half battery from a thousand to twelve hundred men, or a regiment, while a battery of six pieces would be tactically equivalent to two regiments or a brigade on any ground adapted to the employment of field artillery.

It is evident, therefore, that the names given the subdivisions of artillery, and the movements laid down for them, were not derived from any thing in the way of their tactical equivalency to the infantry or cavalry. It certainly cannot be said that it was on account of their object or tactical employment.

There seems to be no objection to using common trumpet calls or signals to indicate whether a movement is to the right or left, front or rear, but the number and *details* of the movements should depend on the nature of the arm of service, and each arm should have commands to indicate clearly what is to be done; their execution should have in view simplicity, and, above all, rapidity. We give far too much attention to uniformity and regularity and not enough to rapidity and to the practical side of the question. We are still amusing ourselves with what in Europe are called "*pure tactics*," or the movements of the parade ground, in contradistinction to "*applied tactics*," which have in view the requirements of the battle-field alone.

While assimilation may facilitate the memorizing of commands, and in this way help us on the parade ground, it will never make a skillful infantry or cavalry soldier out of a light artilleryman, or the reverse.

In short, the mistake has arisen in supposing that what is merely a resemblance of tactical relations is a resemblance of tactical units; in mistaking the names of the things for the things themselves, and in treating them all alike on the ground of this supposed resemblance. (See article by Captain Sanger in "*United Service Magazine*" for May, 1883). In other respects the tactics could be simplified by making the foot instruction the basis of the mounted drills, by having general principles for the guides and alignments, in line, in column and battery, by a system of sabre signals, to be used in

connection with the trumpet calls, and by treating and equipping the caissons as *ammunition wagons*.

Two caissons are sufficient for purposes of instruction; for the other two, which at present form part of the battery of instruction, two guns could be substituted and the *fighting part* of the war battery always maintained and without additional expense. The equipment of our light batteries might be further improved as follows:

1. Provide each gun with a Phipp's-Quinan breech sight, for aiming at objects up to 1200 yards, and with a telescopic sight for greater distances.

2. For the sake of uniformity in aiming, ranges, etc., let the shrapnel and shell have the same weight and be fired with the same charge.

3. The time fuze to be a combination self-igniting fuze (like the Italian say), and, when used with shrapnel, the composition to be so arranged that the fuze will explode short of the range indicated by the arrow head when the fuze is set, a distance equal to the length of the axis of the cone of dispersion, thus saving all calculation on the part of the gunner in setting the fuze.

4. Time fuzes and sights to be graduated in terms of the range, and not in degrees, minutes and seconds.

5. Range finders to form an essential part of the equipment of every battery, and their skillful use considered equal in importance to any other method of determining the range.

6. A steel shield, $\frac{3}{8}$ inches thick, and not more than 150 lbs. in weight, to be provided for each gun of a mounted battery, to form part of the gun carriage; the shields to be used when possible at all ranges between 400 and 1200 yards.

7. Each limber to be provided with 2 felling axes, and each caisson body with 4 shovels, 2 spades and 2 picks; with these tools the cannoneers of a gun can place it under good cover in half an hour.

Batteries are now divided into a *fighting part*, a *train* and *reserve part*.

In route marches, away from the enemy, each caisson follows its piece, but, on approaching the battle field, the battery is divided into three parts, which are echeloned to the rear, when the battery moves into position, the guns and two or three caissons forming the first, the balance of the caissons and spare men and horses the second, and the transport wagons, forge, etc., the third. This facilitates the supply of ammunition and reduces the number of unnecessary casualties to a minimum.

Target Practice.

No matter how perfect a gun may be, it will not exert much influence on the battle-field, if those who are to use it are unskillful and undisciplined.

While in our army the supply of small arms ammunition is practically unlimited, and the facilities for target practice all that can be desired, the batteries of light artillery are allowed but 100 rounds of ammunition, which, as we have no *system* of target practice, are, as a rule, fired without much effect, unless, as it sometimes happens, they are not fired at all.

No suitable ranges or targets are provided, and, except as it may receive the attention of battery commanders, each in his own way, the subject of field artillery target practice seems to be without much interest to any one else.

Each battery should be provided with from 250 to 400 rounds per annum, to be used systematically in all the batteries, and according to *prescribed rules*, somewhat like the following:

1. *Systematic instruction* in the construction and use of sights, and in aiming drill at stationary and movable objects. The following general hints in aiming are suggested; many others might be given:

(a). Explain that guns must be aimed so as to allow for the force of gravity and the *drift* to which projectiles are subject.

(b). In correcting for deviation or *range*, consider only the shooting qualities of the gun firing.

(c). For the sake of uniformity with different men, fix the distance at which the eye should be from tangent scale, and aim quickly so as not to fatigue the eye.

(d). Aim at center of target, and make all corrections for lateral inaccuracy by means of deflection scale, and not by aiming at different sides of target.

(e). In aiming at moving objects, remember the different rates of march or gait, and increase or diminish range by 100, 200, or 300 yards and fire salvos when practicable.

(f). In using deflection scale, move the slide towards the side of deflection; that is, if shot goes to left, move slide to the left.

2. *The use of range finders* and judging distance drill. In this exercise use targets representing the objects of a battle-field, such as men mounted and on foot, field guns, entrenchments, and all prominent objects in range.

3. *The proper employment* of common, ring, and incendiary shells, shrapnel and cannister; that is, when and how fired at column and lines of troops, at rest and in motion.

4. *The targets* should be of wood or cloth, and should represent soldiers kneeling, lying down, standing, and on horseback;* condemned field guns and carriages to represent field batteries, and a simple earthwork for practice at embrasures, for enfilade, ricochet, and curved fire are necessary.

5. *The practice* should commence with firing at known distances, at the ordinary rectangular target with bull's-eye, in order to test the tables of fire and the theoretical instruction in aiming, to determine the angle of drift, the point of impact, and the mean deviation of the shots; a report of which should always accompany this kind of practice.

6. In regulating the direct fire at known distances, the first point is to determine whether or not it is *regular*; that is, whether it corresponds to the indications given in the tables of fire; if it is not, then corrections should be made according to established rules. Apart from the angle of drifts common to all rifled pieces, every gun has its own peculiarities when fired, and in order to judge of the relative accuracy of different guns, it is necessary to fire a number of rounds from each gun, and then compare the results. There are many ways of doing this, the simplest of which is by comparing the areas into which a certain proportion of the shots of each gun will fall.

The construction of these "probable rectangles" is simple enough. First fire a number of shots at the same elevation, and find the *mean range*. Then find the *mean error in range* by taking the differences of range of each shot from the mean range, adding them together and dividing by the number of rounds. By a similar process we obtain the *mean lateral deviation* and the *mean lateral error*. Having obtained for a given range the *mean error in length* and the *mean error in breadth*, multiply them each by 1.69 and the result will give the two sides of a rectangle, into which 25 per cent. of the projectiles will fall. A comparison of rectangles affords a good criterion of the relative accuracy of the guns.†

7. *Firing at unknown distances* for the purpose of practicing the officers and men in obtaining the range, and of learning to regulate

* These targets can be made of rough boards, by linking them together a company, troop, or battery can be readily improvised.

† The substance of paragraph 6 is taken from "Field Artillery," by Major Pratt, R. A.

The shooting peculiarities of each gun in a field battery should be known to the captain, and communicated to the gunners.

the firing by means of the firing itself. This practice can be regulated by precise rules for varying the sights, etc.

8. *Battle firing*, which should be a competitive test, and should be assimilated as nearly as possible to the actualities of the battle-field, the targets representing troops, batteries, etc., in various formations, the distances being unknown, and the time taken to obtain the range and fire a certain number of shots, being used in determining the relative proficiency of the batteries.

The foregoing is but an outline of what should be done to perfect our field artillery in the management of their guns. By systematic inspection before and after the firing, this kind of practice would, more than anything else, determine the character of our guns, ammunition, and the strength and durability of the material.

In this brief outline no attempt has been made to illustrate the principles laid down by examples, or to quote the authorities from which they have been compiled. It is probably sufficient to say that the principles are of general adoption by all recent writers who have carefully considered this subject, and that their value and application have been fully demonstrated

Fire Discipline.

This expression, which has been much used by the Germans, and to which they have given the greatest attention in practice, means simply the *control* of the fire of batteries by the officer in command.

Its main objects are careful aiming, the correct determination of the range, the selection of the object or position to be fired on, and the economical and proper expenditure of the ammunition.

Fire discipline is of the greatest value when firing at moving objects and at close range, when there is a tendency to demoralization.

Field Artillery.

Although the progress in artillery science has completely revolutionized the systems of field artillery which were renowned twenty years ago, this advance has not changed the *theory* of its employment. Its object now, as it then was, is twofold: to *prepare* and to *support*.

That it frequently *decided* the fate of battles when brought upon the field opportunely, and in masses, was no doubt due to the dense tactical formations of the times, and to its superior range and fire effect, as compared with the smooth-bore musket. This rôle it can no longer claim, for up to 1,000 yards the breech-loading rifle is

unquestionably "mistress of the battle-field." Within this zone, the infantry, by skillful handling, gradually reaches the point from which a successful rush can be made, and shock tactics *decide* the battle. That a portion of the guns will be a powerful auxiliary even up to 700 yards (while a portion are covering the advance from greater ranges), and will accompany the infantry as long as they have a horse or a man left, will no doubt be illustrated on the battle-fields of the future.

The Relative Effect of Infantry and Artillery Fire.

No troops, as yet, have been exposed to the fire of the present field guns, which have reached the very high velocity of 1,700 feet, and whose shrapnel, with from 90 to 210 bullets, and ring shell, of from 150 to 200 fragments, are effective at ranges of from 3,000 to 5,000 yards; nor have the guns reached the limit of their development.

What further development may be looked for in musketry fire, and how will the increased power of the guns affect the relation between the artillery and infantry? Let those who answer the question bear in mind that no improvement in the rifle can add much to the eye-sight, the nerve, or endurance of a soldier in battle, and that while the efficiency of infantry depends so much upon these qualities, the mechanical operation of loading and firing guns does not require an equal amount of steadiness in order to obtain a correspondingly good result. Of the three arms of service it may be said that the artillery, from the nature of its organization and duties, is the least affected by the influences which impair the morale of troops on the battle-field. The guns are rarely injured, and never feel fatigue or excitement. In short, "the effect of artillery depends mainly on its fire and method of employment; these can be improved by a higher and more practical discipline and drill, by increasing the destructive effects of the gun," and by the use of some kind of artificial cover which will relieve the cannoneers from the distracting dangers of infantry fire at close range, and enable them to serve the guns in a manner heretofore unattainable.

In brief, while infantry fire has apparently reached a limit beyond which it will not go, for some time to come, the near future will witness a great improvement in the power and employment of field artillery.

The question as to the relative value of artillery and infantry fire will not, it is believed, be answered by the assertion, so often and

curtly made of late, that, in its influence on the fate of battles, field artillery is but an auxiliary arm, and can aspire to a rôle no higher. No battles have been fought with the improved guns and ammunition of the present day, and the inferences which have been drawn from the war between Russia and Turkey in regard to artillery and unaimed infantry fire, are, to say the least, unscientific and unsafe. The Russian guns were of inferior quality even at that time, and the artillery personnel of both armies but poorly instructed; but despite these drawbacks, the artillery did well when properly commanded.

The Employment of Field Artillery.

Field artillery has no independent rôle on the battle-field; its operations are performed in conjunction with those of the other arms.

Its functions are to prepare a way for an attack of infantry or cavalry; to support them in the advance to an assault, or to cover their retreat in the event of a reverse.

To do this effectually requires thorough training, bold and skillful handling, a knowledge of the tactics of the other arms, and a clear understanding of the designs of the officer in command.

As the effect of Artillery depends to a very great extent upon its fire, special attention should be paid by artillery commanders to the topography of the ground on which they are to act. Those who value their reputation, and who expect to achieve important results, will not feel satisfied with deputing to another officer the performance of this task; but, whenever they can, will *invariably* give their personal attention to the

Choice of a Position.

Whether operating with the advanced guard, the rear guard, or main body of a large or small force, either on the offensive or defensive, the following are probably the main points to observe:

1. *Efficiency of fire*; that is, the development of the full power of the guns, which are effective at from 3,000 to 5,000 yards. In order to compensate for, or offset the fire of infantry at short range, it must be brought under fire at distances which will render its own fire practically of no effect.

2. *The crest* of a gradual slope, having a command of about 100 feet, with no prominent object in the vicinity, by means of which the enemy may have determined the range, from which an un-

obstructed fire can be had to the front and flanks, and from which an advance, a retreat, or a flank movement can be made, is doubtless an ideal offensive position. The more abrupt the slope on the defensive the better.

3. *The general line of the guns* should, when practicable, be perpendicular to the line of fire, and the extent of the position not only sufficient for the guns first put in, but for those which are to follow.

4. *A position in stony or rocky ground*, as the most favorable to the effect of the enemy's fire, should be avoided when possible.

5. *Although obstacles*, such as a marsh or a precipice, either in front or on the flanks, will delay the advance of the enemy, and enable the batteries to continue in action up to the last moment, it should be remembered that they restrict the free movement of the guns, which in an attack might prove fatal to the result. On the defensive these objections would not exist.

6. *Cover for the guns*, and especially for the limbers and caissons, is of course, most desirable, and should govern the selection of a position which is otherwise advantageous; in fact, the mobility and fire of the batteries depend in a very great measure on the preservation of the horses. Gun-pits should be constructed when time permits.

7. As the deviation of artillery projectiles is mainly in *range*, the position should, if possible, permit an oblique fire on lines and a direct fire on approaching columns, and a *concentrated* fire upon the point to be attacked. This is usually and better accomplished by pointing the guns than by forming the batteries in oblique lines, which would subject them to an enfilade fire.

8. As it is important to maintain the fire of the batteries uninterruptedly, changes of position should be as infrequent as possible.

9. Although a position either in front or rear of other troops has heretofore been considered disadvantageous, as presenting a double object to the enemy, and while it will rarely be advisable to place guns much in advance of the infantry, it will no doubt be often necessary to fire over the heads of advancing troops. The long range of the guns, and the great improvements in the ammunition, will render this less hazardous than it has been.

10. Before occupying a position, the batteries of each division should be deployed, and should open fire simultaneously. Successive formations are extremely hazardous, enabling the enemy to concentrate on each battery, or group of batteries, as it appears.

As far as possible the movement of the artillery should be concealed until the guns are ready to open.

The Field of Fire.

This is comprised within a circle of from 3,000 to 5,000 yards' radius, and may be divided into three zones, which correspond to the three stages of modern battles, viz.:

1. The attack of the advanced guard. Batteries open between 3,000 and 4,000 yards.

2. The artillery duel preceding and accompanying the deployment and advance of the main body. Batteries advance to 1,800 yards, the main position for artillery duel.

3. The final assault, either by a front or flank movement, or by a combination of both. Batteries at about 1,200 yards advance to 800 or 600 yards if imperative necessity demands.

The Offensive.

In the vicinity of the enemy the formation of troops on the march is such as to facilitate a rapid deployment into line of battle.

The artillery is placed as near the head of column as its safety will admit, so that it may be brought into action at the beginning of the engagement with the least possible delay.

To ensure this, the divisional batteries follow directly in rear of the first regiment of the division, and the corps artillery directly in rear of the first division of the corps. In a thickly wooded country a modification of this rule would no doubt be advisable, as in the attack of a position the batteries might be brought under fire without the ability to reply.

As soon as the enemy is discovered, the artillery of the advanced guard, which should be taken from the leading division, moves forward as rapidly as the ground will admit, and takes position preferably on the flank and opens fire.

When the artillery commander goes forward to select his position he should be accompanied by a range-finding party, which, after ascertaining the distance to the enemy, will determine the range to all prominent objects in view.

Advanced Guard Batteries.

The fire of the batteries of the advanced guard is directed against the most advanced posts of the enemy, for the purpose of driving them in, and then, if practicable, against the artillery of the main

line, in order to develop its extent and general disposition, and to facilitate the deployment of the troops as they come up.

During the attack of the advanced guard the commander of the force decides what is to be done, and communicates his plans to the artillery commander, which determines in a measure the position of the other batteries as they arrive.

The remaining batteries of the leading division, supposing the force to consist of at least one army corps, would form on the outer flank of the battery or batteries already engaged; the second division would deploy and take position, with its batteries either united with those of the first division, or else on the outer flank. If the corps had three divisions the third would be in reserve, though if the ground is suitable the batteries would no doubt engage.

It is generally considered advisable for the corps artillery to take a central position; therefore, in placing the infantry divisions in line a suitable interval should be left.

Every available gun of the entire corps is put in action, for the purpose of cannonading the entire line, while the other troops are moving into position. In this stage, the batteries are about 1,800 yards from the main line of the enemy. The guns should be concentrated, the battery division, of three or four batteries, being the smallest tactical unit that can produce any decided effect. Larger masses of artillery will be formed according to circumstances.

As soon as the turning or flank movement has been decided on, the fire of a portion of the guns should be concentrated on the side of the movement. This can be done by withdrawing and shifting a certain number of the batteries engaged, or by bringing up fresh batteries to coöperate with the turning force. As it is important to deceive the enemy in regard to the real point of attack, any sudden cessation, or change in direction or volume of fire along the line, should be avoided. As soon, however, as the flank attack has fairly commenced, a powerful enfilade fire should, if possible, be directed against that flank.

During the third stage of the battle, the infantry advances to a position from which an assault can be made. The batteries whose fire is masked by the movement will dash forward from 600 to 800 yards, to support the infantry while the batteries which have a clear front continue the cannonading.

At this period, the front or flank attack has either proved successful or there has been a repulse. If a success has been gained, the entire line presses forward, as many of the batteries as may

be needed pursuing with the infantry and cavalry. In the event of a repulse, the position of the advanced batteries become perilous, and their safe withdrawal very doubtful, as they should continue the firing to the last moment, in order to cover the retreat of the other arms. The *necessary* loss of a battery under such circumstances, although to be regretted, should be no reflection upon the management of the artillery; on the contrary, it should be considered the highest honor within the reach of the light artillery service.

The Defensive.

In all actions, combats, or battles, one side or the other, generally the weaker, is for the time being on the defensive, and either from necessity or from choice, with a view to assuming the offensive when the troops which attack have been reduced by casualty, and demoralized by the severe fire of the defence. The first object of the defence is to prevent the attacking force from obtaining a correct knowledge of the extent and character of the position, and of the number and disposition of the troops which occupy it; the second, to inflict such losses upon the assailants before they have gained a favorable position for the final assault as to equalize the disparity between the contending forces, and enable the defenders to assume the offensive if desirable. The part taken by the artillery in a defensive battle is, if anything, more important than in the attack, and consequently, a good position for the guns should be paramount, and should not, as in the attack, depend upon that of the other arms.

A defensive battle begins with a combat between the out-posts of the defenders and the advanced guard of the attacking force.

What part the artillery will take in these preliminary actions must depend upon circumstances.

It is presumed, however, that no skillful commander will throw away or compromise the advantages of his position by any serious fighting in front of the main line, except to hold some important salient point, and therefore the batteries will not generally be sent to the front. The case of a repulse, whereby an attacking force is obliged to assume the defensive, has been briefly referred to. The most advanced batteries hold on as long as possible, and to the end, if necessary, supported by the fire of those in rear, until all are gradually withdrawn to the position taken up. The retirement would be effected by echelon of batteries, battery divisions, or masses, in such manner as to maintain the fire, and retard as far as

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possible the advance of the enemy. When a defensive position is deliberately selected there is usually sufficient time to entrench, and the management of the batteries is chiefly confined to fire discipline and the supply of ammunition.

After selecting the position for the defensive line, the commanding general decides where the artillery is to be posted, and whether all the batteries are to be posted at once or held in reserve to await the development of the attack. As this is preceded by a heavy artillery fire on the part of the attacking force, which is usually superior, all the batteries should take position if the ground is suitable. In the case of a small force this rule is still more imperative. In short, there seems to be no doubt that on most, if not all occasions, the artillery of both sides should make their supreme effort in the artillery duel, which must preface every infantry attack. As soon as the positions of the batteries have been designated, the battery commanders should reconnoitre the ground thoroughly in front and rear, construct gun pits, if time is not wanting, and ascertain the distance to all the positions and prominent objects, which the enemy will probably occupy in the different stages of the battle, or near which his troops may be moved.

In apportioning the artillery to the defensive line, it is considered advisable to group the batteries by divisions, or in larger bodies, at strong points, and not attempt to distribute it along the entire line. This gives unity of command, a better control of the guns, and concentration of fire, all of which is of the greatest importance.

By considering the method of attack the employment of the guns becomes apparent.

A front and flank attack are usually combined, the real intention being concealed as far as possible, and one of the two attacks being used as a feint to deceive the defenders. The dispositions are made under cover of an artillery duel, directed at first against the batteries of the entire line, but which finally converges on the point selected. This, together with the other dispositions of the enemy, must determine in a great measure the final arrangement of the batteries of the defence. A slight participation in the preliminary combat, a full share in the artillery duel, and a concentrated, deadly, and persistent fire in defence of the point of attack will complete the role of the batteries in the main line.

The fire of the defensive batteries is regulated by dividing the attacking force into sections and assigning them to each battery division or group of defensive batteries. In each division or group one or more batteries should be directed to watch for any change of

position on the part of the attacking batteries, and to fire on them during the movement. Similarly, in order to cover columns and lines of troops, the batteries should vary the elevation and length of fuze so as to bring the enemy under a searching fire at all points.

The Authority of Artillery Commanders.

Those who are familiar with the history of our army are aware that this has been a disputed point. It has been one in all armies, but notably so in our own. * It is universally the custom to allow artillery commanders direct control in technical matters, but in handling the guns in action it is usually expected that they will give orders only as staff officers; that is, in the name of their respective army corps or division generals. This seems to be proper enough and on ordinary or unimportant occasions there would be no difficulty in complying with the rule, but in the phazes of a great battle or series of combats, the part taken by the artillery and the circumstances of its employment are such that to enact a compliance with this roundabout way of giving orders would no doubt embarrass, even if it did not seriously detract from the efficiency of the artillery.

Modern artillery organization seems to necessitate the following hierarchy of commanders, viz: general officers, as army, and army corps artillery chiefs, colonels to command "corps" artillery, and lieutenant-colonels or majors the divisional artillery. The question is, what independent authority and command should these officers exercise in the employment of their arm on the battle field? The tendency in foreign armies is towards greater control and stricter accountability. It is the inevitable result of the increasing value of artillery on the battle field, and the absolute importance of directing it with a full and exact knowledge of its capabilities. The tactics of modern field artillery *demand* that it be used in large masses, that its fire be controlled, and that its personnel, material, and ammunition be constantly maintained. If the extent of ground taken up by a large number of batteries be considered, the necessity of their prompt and intelligent advance or removal, so as to afford the requisite support to the other troops engaged, can only be accomplished by officers who are thoroughly familiar with their exact condition at the moment, and can rarely be successfully directed by those whose minds are occupied with the command of an extended fighting line, and whose attention is absorbed in observing the movements of the enemy and in penetrating his designs. Of course

* See June number of United Service Magazine of 1883 for a brief resume of the subject under caption of "Artillery Organization."

where generals who are responsible are present the question could not arise, and when they are absent the orders of artillery commanders should be given all the weight necessary to enable them to bring out the full power of their arm.

Horse Artillery.

Although the question as to the relative mobility of mounted and horse artillery, and the necessity for maintaining the latter as a separate branch of field artillery, has been often raised and discussed, it seems to be now universally acknowledged that owing to the frequent, lengthy, and rapid marches of the cavalry of the present, horse batteries alone have the requisite mobility.

Machine Guns.

As the precise rôle of these guns has not been determined it is not easy to discuss their advantages. It seems to be admitted on all sides that for certain defensive purposes they are unsurpassed; for offensive use not much has been said in their favor. It may be remarked then that their sphere is limited as compared with field artillery, which is useful in all kinds of ground, against all kinds of objects, and at great distances. A very slight inequality of ground renders the fire of machine guns of but little effect, and of course against entrenchments they are practically useless. On the other hand the personnel and material of such batteries is almost equal to that of field batteries, and they require just as much of a support for their protection. Assuming that the proportion of guns is but three and a half to four per one thousand combatants, the question is, how many of these shall be machine guns. In other words, how many field guns, which are useful under all circumstances, shall be displaced from the line of battle to provide room for machine guns of limited and special use? I believe that if they are ever extensively employed on the offensive it will be with cavalry. Mounted on carts and distributed through a cavalry division, their presence would not be easily detected, and their mobility would enable them to accompany the cavalry at all times. On ground suited to a cavalry charge they would aid materially in keeping down artillery and infantry fire, and prepare the way for the attack. They would assuredly double the defensive power of the cavalry.

—*Captain Joseph P. Sanger, Light Battery K, 1st Artillery.*

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ADDENDA.

Sharpshooters.

* * * *

II.—The grade of sharpshooter is established. To enter this class the following percentages will be required: 88 per cent. at 200, 300, and 600 yards each, and 76 per cent. at 800, 900, and 1,000 yards each. Division and department commanders in their discretion will extend to sharpshooters such privileges as the interests of the service will permit.

* * * Hereafter the best three scores made (each

having the required percentage) will determine annual classifications. In calculating the figure of merit all company officers and regimental staff will be included; sharpshooters will each be given a multiplier of 200. Besides those now excluded from consideration, all who desert or are transferred or discharged during the first month, and all who are prevented by sickness from firing during the whole practice season, will also be disregarded. Medical certificates will be required to accompany exceptions claimed on account of sickness. * * *

Department totals will include only those actually classified in the departments, and will not comprise companies firing in other departments.

III.— * * The following insignia will be worn

to indicate skill in marksmanship: Marksmen qualifying during the current year will always wear one pair of marksman's buttons. Those qualifying for the second time may wear two pairs. After qualifying three times (not necessarily in consecutive years), a marksman's pin will be worn on the left breast. Those wearing marksman's pins will not wear more than the single pair of marksman's buttons, indicating renewed qualification during the year. A sharpshooter will be indicated by a small bronze cross worn below the opening of the coat-collar while he continues to qualify annually in that class. The

cross and the pin will be the property of the winners, and they may be worn upon the breast after ceasing to qualify in the corresponding classes. * * * Commissioned officers may wear these insignia at their option, if entitled to them.

When, through no fault of his own (such as continued detached service or sickness through the entire practice season), a marksman or a sharpshooter has no opportunity to qualify the next succeeding year, he may continue to wear the insignia of his class for another year. * * * * *

Qualifying scores will be entered at department headquarters and the certificates issued to those entitled to receive them.

IV. Hereafter, all duly qualified marksmen in the Army will be considered eligible for selection to attend annual department competitions; but whenever any marksman has been three times member of a department team or has won any three of the authorized prize medals, he will be announced in general orders from these headquarters as belonging to a distinguished class no longer eligible to compete for these honors without special permission from the commanding general of the Army.

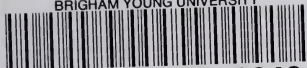
Post commanders will send only enlisted men to represent companies at contests for places upon department teams, but department commanders may select (upon recommendations by post commanders) two commissioned officers from each regiment in their commands to compete. In the discretion of department commanders, staff officers may be allowed to enter department competitions.

At all annual competitions for prizes and places upon teams, distances will remain as heretofore, but the total of the best two days' scores of the three fired will determine composition of teams. Preliminary practice will not exceed five days for department contests or three days for division and Army competitions. Individual skirmish matches will always be held at these meetings, and scores will be carefully recorded and announced as contemplated by General Orders No. 53, series of 1882, from these headquarters. This very important kind of target practice will not be neglected. A medal will be awarded to the skirmishers making the best individual score at each of the annual competitions for department, division, and Army prizes.

—G. O. No. 12, *Headqrs. Army*, 1884.



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